Software User Guide

Cayman® Operating System Version 6.3

netopia®

MAKING BROADBAND WORK™

Cayman® 3346 by Netopia

January 2003

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Netopia, Inc. Part Number: 6161139-00-02d4 v011503

Table of Contents

CHAPTER 1 Introduction

About Cayman Documentation

NOTE:

This guide describes the wide variety of features and functionality of the Cayman 3346, when used in Router mode. The Cayman 3346 may also be delivered in Bridge mode. In Bridge mode, the Gateway acts as a pass-through device and allows the workstations on your LAN to have public addresses directly on the internet.

Netopia, Inc. provides a suite of technical information for its Cayman-series family of intelligent enterprise and consumer Gateways. It consists of:

- *Software User Guide*

- Dedicated Quickstart guides
- Specific White Papers

The documents are available in electronic form as Portable Document Format (PDF) files. They are viewed (and printed) from Adobe Acrobat Reader, Exchange, or any other application that supports PDF files.

They are downloadable from Netopia’s website:
http://www.netopia.com/

Intended Audience

This guide is targeted primarily to residential service subscribers.

This guide may also be of use to the support staffs of broadband service providers and advanced residential service subscribers.

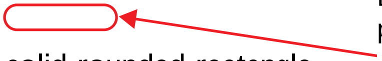
Documentation Conventions

General

This manual uses the following conventions to present information:

Convention (Typeface)	Description
bold italic monospaced	Menu commands
bold italic sans serif	Web GUI page links and button names
`terminal`	Computer display text
`bold terminal`	User-entered text
Italic	Italic type indicates the complete titles of manuals.

Internal Web Interface

Convention (Graphics)	Description
dot-dashed rectangle or line	Denotes an "excerpt" from a Web page or the visual truncation of a Web page
 solid rounded rectangle with an arrow	Denotes an area of emphasis on a Web page

Command Line Interface

Syntax conventions for the Cayman Gateway command line interface are as follows:

Convention	Description
straight ([ ]) brackets in cmd line	Optional command arguments
curly ({ }) brackets, with values separated with vertical bars (|).	Alternative values for an argument are presented in curly ({ }) brackets, with values separated with vertical bars (|).
`bold terminal type face`	User-entered text
`italic terminal type face`	Variables for which you supply your own values

Text

The words “Cayman Gateway” and “Gateway” refer to the Netopia Cayman 3346 Gateway.

The expressions “Release 6.3.0” and “R 6.3.0” refer to the most recent generally available Cayman Operating System.

Organization

This guide consists of seven chapters, including a glossary, and an index. It is organized as follows:

- **Chapter 1, "Introduction"** — Describes the Cayman document suite, the purpose of, the audience for, and structure of this guide. It gives a table of conventions and presents a product description summary.
- **Chapter 2, "Quickstart"** — Describes how to get up and running with your Cayman 3346.
- **Chapter 3, "Basic Troubleshooting"** — Gives some simple suggestions for troubleshooting problems with your Gateway's initial configuration.
- **Chapter 4, "Web-based User Interface"** — Focuses on the user interface for advanced users. It is organized in the same way as the Web UI is organized. As you go through each section, functions and procedures are discussed in detail.
- **Chapter 5, "Advanced Troubleshooting"** — Gives suggestions and descriptions of expert tools to use to troubleshoot your Gateway's configuration.
- **Chapter 6, "Command Line Interface"** — Describes all the current text-based commands for both the SHELL and CONFIG modes. A summary table and individual command examples for each mode is provided.
- **Chapter 7, "Glossary"**
- **Index**

Overview of Major Capabilities

The Netopia 3346 offers simplified setup and management features as well as advanced broadband router capabilities. The following are some of the main features of the Netopia 3346:

- **Wide Area Network Termination**

  The 3346 combines a traditional modem with an Internet router. It translates protocols used on the Internet to protocols used by home personal computers and eliminates the need for special desktop software (i.e. PPPoE).

- **Simplified Local Area Network Setup**

  Built-in DHCP and DNS proxy features minimize or eliminate the need to program any network configuration into your home personal computer.

- **Management**

  A Web server built into the Cayman Operating System makes setup and maintenance easy using standard browsers. Diagnostic tools facilitate troubleshooting.

- **Security**

  Network Address Translation (NAT), password protection, and other built-in security features prevent unauthorized remote access to your network. Pinholes, default server, and other features permit access to computers on your home network that you can specify.

CHAPTER 2 Quickstart

Most users will find that the basic Quickstart configuration is all that they ever need to use. This section may be all that you ever need to configure and use your Cayman 3346. The following instructions cover installation in *Router Mode*.

This section covers:

- "Important Safety Instructions" on page 16
- "1. Unpack the Cayman Gateway" on page 17
- "2. Set up the Cayman Gateway" on page 18
- "3. Configure the Cayman 3346" on page 22
- "Cayman 3346 Status Indicator Lights" on page 25
- "Home Page" on page 26

If your Cayman 3346 was delivered in Bridged Mode, see "Bridged Mode Quickstart" on page 28.

Important Safety Instructions

POWER SUPPLY INSTALLATION

Connect the power supply cord to the power jack on the Cayman 3346. Plug the power supply into an appropriate electrical outlet.

CAUTION:

The Cayman 3346 is designed for use only with a UL Listed or CSA Certified Class 2 power supply or Limited Power Source, rated 12Vdc, 1A. Do not substitute other non-approved power sources.

TELECOMMUNICATION INSTALLATION

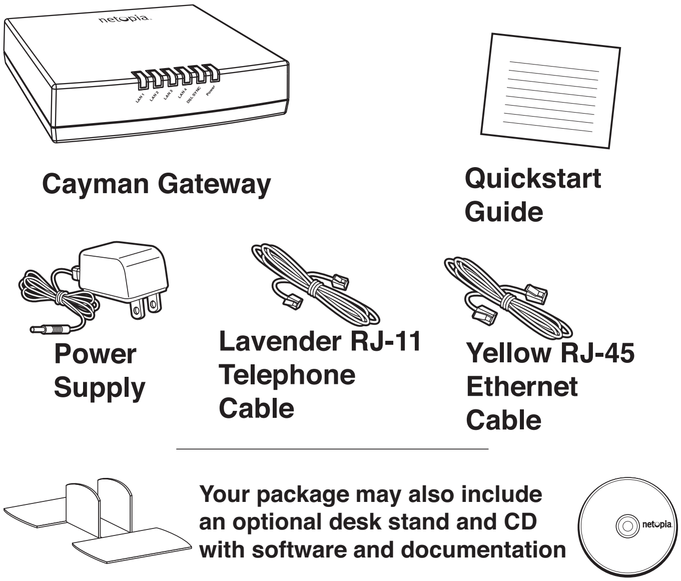
When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

- Do not use this product near water, for example, near a bathtub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

SAVE THESE INSTRUCTIONS

1. Unpack the Cayman Gateway

Verify your package contents.


netopia
Cayman Gateway
Quickstart Guide
Power Supply
Lavender RJ-11 Telephone Cable
Yellow RJ-45 Ethernet Cable
Your package may also include an optional desk stand and CD with software and documentation
netopia

2. Set up the Cayman Gateway

1. **Place the Cayman 3346 near your PC or another location that permits easy access and visibility.**

   Make sure any Ethernet cables are kept away from power cords, fluorescent lighting fixtures, and other sources of electrical interference. Put the Cayman Gateway in a location where air can circulate freely around it.

2. **Connect the power supply to the power jack on the Cayman 3346 back panel. Plug the power supply into an appropriate electrical outlet.**

3. **Turn the power on with the power switch.**

   The Power light should come on solid green.

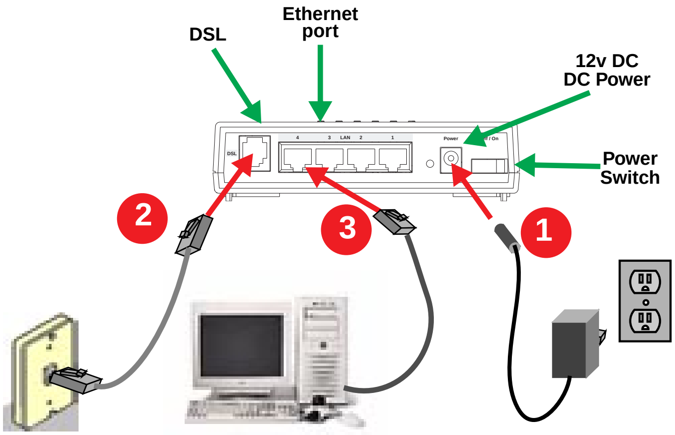
4. **Connect the supplied lavender telephone cable from the DSL port on the Cayman Gateway to the wall jack that supports your DSL service.**

   The DSL SYNC indicator light should blink for up to two minutes and then come on solid green.

5. **Use the yellow Ethernet cable to connect one of the Cayman Gateway's Ethernet ports to your PC's Ethernet port.**

   A LAN light should come on solid green for the port where you connected the cable.

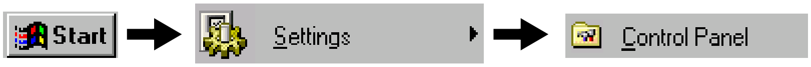
Ethernet Connection



Be sure to enable Dynamic Addressing on your PC. Perform the following:

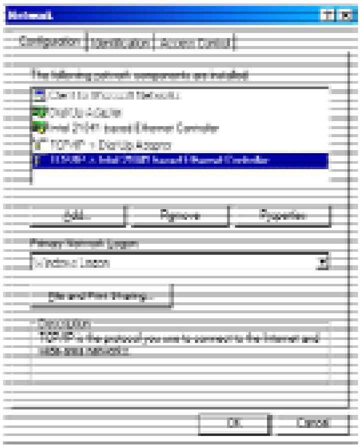
• Windows 95, 98 and ME.

On your computer, go to:



Open the Network window by double-clicking the Network Icon Network

In the list of network components, highlight the entry that says “**TCP/IP ([your Ethernet card here])**”.



Click Properties

In the TCP/IP Properties window,

Select ● Obtain an IP address automatically and click OK

In the Network window, click OK and restart your computer.

Proceed to “3. Configure the Cayman 3346” on page 22.

• Windows 2000 and XP

- Right Click on the ***My Network Places*** icon on your Windows desktop and select ***Properties***.
- Select your ***Local Area Connection***.
- Right click on your ***Local Area Connection*** and select ***Properties***.

- Select ***Internet Protocol [TCP/IP]***.
- Click the ***Properties*** button.
- Click the ***Obtain IP address automatically*** radio button and the ***Obtain DNS server address automatically*** radio button. Click the ***OK*** button.

Proceed to "3. Configure the Cayman 3346" on page 22.

• Macintosh Mac OS

Your Macintosh must be using MacOS 7.6.1 or higher.

- Select ***Control Panels*** from the Apple Menu.
- Open the TCP/IP Control Panel.
- Choose ***Connect via Ethernet***.
- Choose ***Configure Using DHCP Server***. Close and Save.

Proceed to "3. Configure the Cayman 3346" on page 22.

• Mac OS X

- Launch System Preferences from the Dock or from the Apple Menu.
- Select the ***Network*** Preference Pane.
- Choose ***Show: Built-in Ethernet***.
- Click the TCP/IP tab.
- Choose ***Configure: Using DHCP***.
- Quit System Preferences.
- You do not have to restart the Macintosh. Launch your Web browser, such as Netscape Navigator or Internet Explorer.

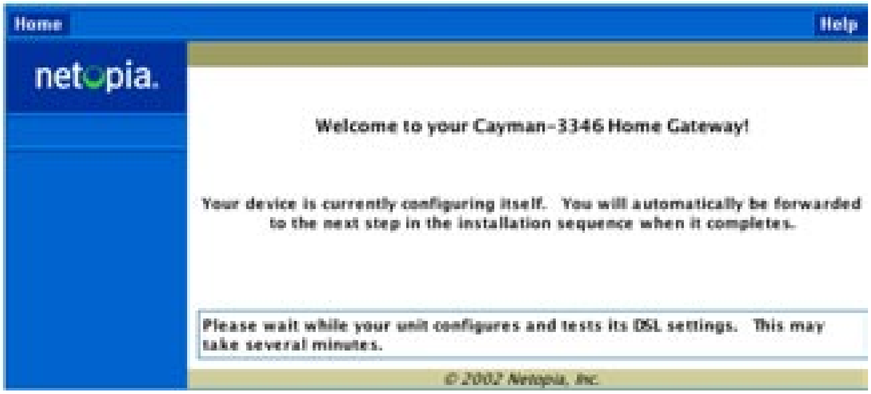
Proceed to "3. Configure the Cayman 3346" on page 22.

3. Configure the Cayman 3346

1. **Run your Web browser application, such as Netscape Navigator or Microsoft Internet Explorer, from the computer connected to the Cayman Gateway.**

   Enter ***http://192.168.1.254*** in the Location text box.

   The browser displays the Welcome page.



Welcome to your Cayman-3346 Home Gateway!

Your device is currently configuring itself. You will automatically be forwarded to the next step in the installation sequence when it completes.

Please wait while your unit configures and tests its DSL settings. This may take several minutes.

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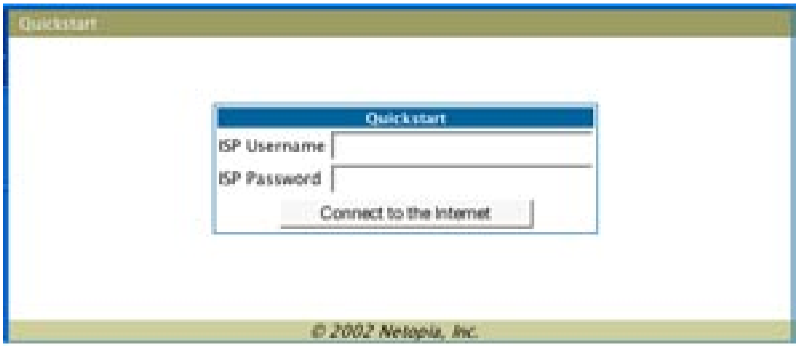
   The browser then displays the Quickstart web page.



ISP Username

ISP Password

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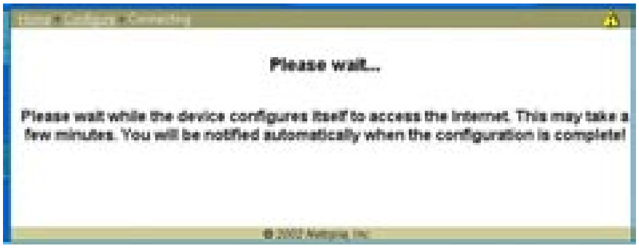
2. **Enter the username and password supplied by your Internet Service Provider. Click the *Connect to the Internet* button.**

Once you enter your username and password here, you will no longer need to enter them whenever you access the Internet. The Cayman 3346 stores this information and automatically connects you to the Internet.

The Gateway displays a message while it configures itself.



Please wait...

Please wait while the device configures itself to access the Internet. This may take a few minutes. You will be notified automatically when the configuration is complete!

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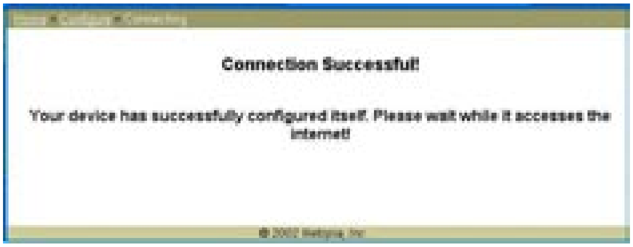
3. **When the connection succeeds, your browser will display a success message.**



Connection Successful!

Your device has successfully configured itself. Please wait while it accesses the internet!

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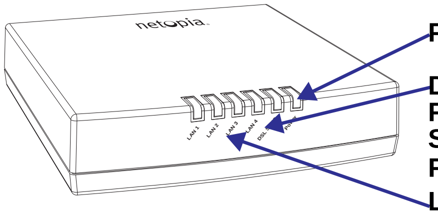
Once a connection is established, your browser is redirected to your service provider’s home page.

4. **Congratulations! Your installation is complete. You can now surf to your favorite Web sites by typing an URL in your browser’s location box or by selecting one of your favorite Internet bookmarks.**

Note to Customers with Monitored Alarms or Emergency Response Systems:
Contact your alarm or emergency response monitoring company and explain that you have installed DSL service at your business and would like to test your alarm system. The monitoring company will provide you with specific instructions to complete this test. If the alarm fails only when the modem is on, immediately contact BellSouth FastAccess Service at 1-888-321-2DSL (2375), option 2.

Cayman 3346 Status Indicator Lights

The following figure illustrates the functions of the status indicator lights on the Cayman Gateway.



Power - Green when power is applied

DSL SYNC -
Flashes green when training.
Solid green when trained.
Flashes green for DSL traffic.

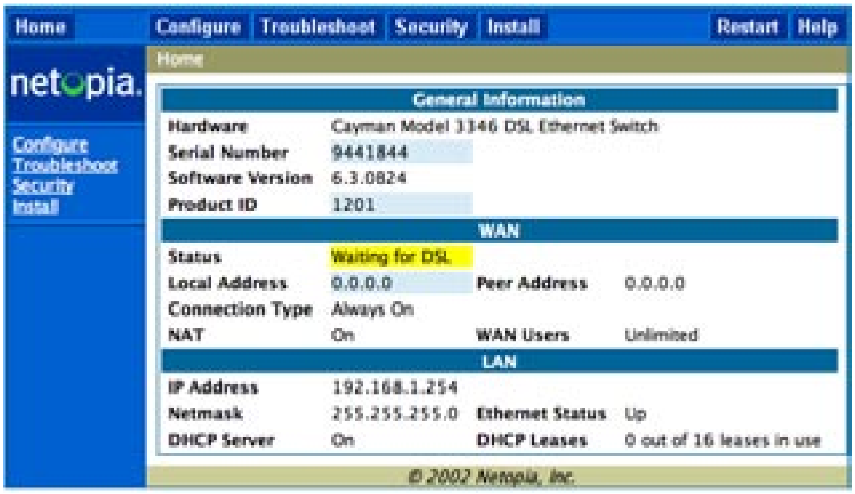
LAN 1, 2, 3, 4 -
Solid green when connected to each port on the LAN.
Flash green when there is activity on each port.

Home Page

After you have performed the basic Quickstart configuration, any time you log in to your Cayman Gateway you will access the Cayman 3346 Home Page.

You access the Home Page by typing ***http://cayman*** in your Web browser's location box.

The Cayman 3346 Home Page appears.



General Information			
Hardware	Cayman Model 3346 DSL Ethernet Switch		
Serial Number	9441844		
Software Version	6.3.0824		
Product ID	1201		
WAN			
Status	Waiting for DSL		
Local Address	0.0.0.0	Peer Address	0.0.0.0
Connection Type	Always On		
NAT	On	WAN Users	Unlimited
LAN			
IP Address	192.168.1.254		
Netmask	255.255.255.0	Ethernet Status	Up
DHCP Server	On	DHCP Leases	0 out of 16 leases in use

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The Home Page displays the following information in the center section:

Item	Description
Local WAN IP Address	This is the negotiated address of the Gateway's WAN interface. This address is usually dynamically assigned.
Remote Gateway Address	This is the negotiated address of the remote router to which this Gateway is connected.
Primary DNS **Secondary DNS**	These are the negotiated DNS addresses.
ISP Username	This is your PPPoE username as assigned by your service provider.
Status of Connection	'Waiting for DSL' is displayed while the Gateway is training. This should change to 'Up' within two minutes. 'Up' is displayed when the ADSL line is synched and the PPPoE session is established.
Serial Number	This is the unique serial number of your Gateway.
Software Release	This is the version number of the current embedded software in your Gateway.
Warranty Date	This is the date that your Gateway was installed and enabled.
Ethernet Status	Local Area Network (Ethernet) is either ***Up*** or ***Down***

The links in the left-hand column on this page allow you to manage or configure several features of your Gateway. Each link is described in its own section.

Bridged Mode Quickstart

Important Safety Instructions

POWER SUPPLY INSTALLATION

Connect the power supply cord to the power jack on the Cayman Gateway. Plug the power supply into an appropriate electrical outlet.

CAUTION:

The Cayman Gateway is designed for use only with a UL Listed or CSA Certified Class 2 power supply or Limited Power Source, rated 12Vdc, 1A. Do not substitute other non-approved power sources.

TELECOMMUNICATION INSTALLATION

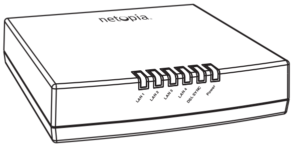
When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

- Do not use this product near water, for example, near a bathtub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

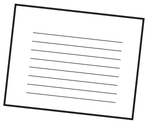
SAVE THESE INSTRUCTIONS

1. Unpack the Cayman Gateway

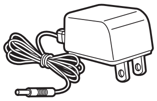
Verify your package contents.



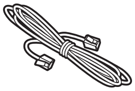
Cayman Gateway



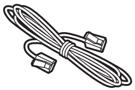
Quickstart
Guide



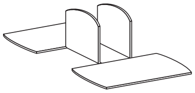
Power
Supply



Lavender RJ-11
Telephone
Cable



Yellow RJ-45
Ethernet
Cable



Your package may also include
an optional desk stand and CD
with software and documentation

2. Set up the Cayman Gateway

Your Cayman Gateway was shipped in Bridged mode and will function as a traditional ADSL modem.

In order to continue installation you may need to have PPPoE client software installed on your PC. The PPPoE software and instructions are provided by your Internet Service Provider. You should first install this software before proceeding with the installation of the Cayman Gateway.

1. **Place the Cayman Gateway near your PC or another location that permits easy access and visibility. You can lay the Cayman Gateway flat, or stand it upright using the supplied cradle.**

   Make sure any Ethernet cables are kept away from power cords, fluorescent lighting fixtures, and other sources of electrical interference. Put the Cayman Gateway in a location where air can circulate freely around it.

2. **Connect the power supply to the power jack on the Cayman Gateway back panel. Plug the power supply into an appropriate electrical outlet.**

3. **Turn the power on with the power switch.**

   The Power light should come on solid green.

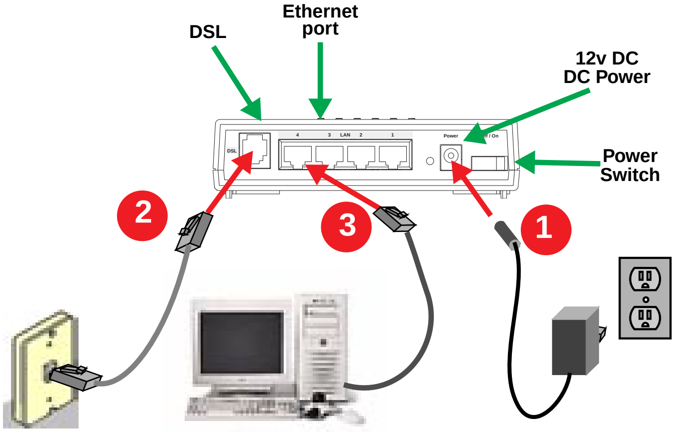
4. **Connect the supplied lavender telephone cable from the DSL port on the Cayman Gateway to the wall jack that supports your DSL service.**

   The DSL Sync indicator light should blink for up to two minutes and then come on solid green.

5. **Connect a yellow Ethernet cable to an Ethernet port on the Cayman Gateway.**

   Connect the cable as shown in the following diagram for the first computer:

Ethernet Connection



Use the yellow Ethernet cable to connect one of the Cayman Gateway’s Ethernet ports to your PC’s Ethernet port. The Ethernet Link light should come on solid green.

6. **Congratulations! Your installation is complete. You can now surf to your favorite Web sites by typing an URL in your browser’s location box or by selecting one of your favorite Internet bookmarks.**

CHAPTER 3 Basic Troubleshooting

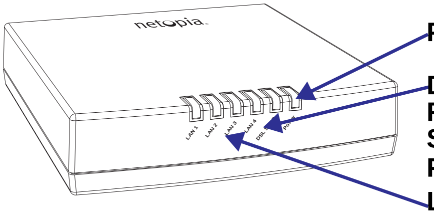
This section gives some simple suggestions for troubleshooting problems with your Gateway's initial configuration.

Before troubleshooting, make sure you have

- read the *Quickstart Guide*;
- plugged in all the necessary cables; and
- set your PC's TCP/IP controls to obtain an IP address automatically.

Status Indicator Lights

The first step in troubleshooting is to check the status indicator lights (LEDs) in the order outlined below.



Power - Green when power is applied

DSL SYNC -
Flashes green when training.
Solid green when trained.
Flashes green for DSL traffic.

LAN 1, 2, 3, 4 -
Solid green when connected to each port on the LAN.
Flash green when there is activity on each port.

LED Function Summary Matrix

	Power	DSL SYNC	LAN 1, 2, 3, 4
Unlit	No power	No signal	No signal
Solid Green	Power on	DSL line synched with the DSLAM	Synched with Ethernet card
Flashing Green	N/A	• Attempting to train with DSLAM • Traffic on the DSL link	Activity on the Ethernet cable

If a status indicator light does not look correct, look for these possible problems:

LED	State	Possible problems
Power	**Unlit**	1. Make sure the power switch is in the ON position. 2. Make sure the power adapter is plugged into the Gateway properly. 3. Try a known good wall outlet. 4. Replace the power supply and/or unit.
DSL SYNC	**Unlit**	1. Make sure the you are using the correct cable. The DSL cable is the thinner standard telephone cable. 2. Make sure the DSL cable is plugged into the correct wall jack. 3. Make sure the DSL cable is plugged into the DSL port on the Gateway. 4. Make sure the DSL line has been activated at the central office DSLAM. 5. Make sure the Gateway is not plugged into a micro filter.
LAN 1, 2, 3, 4	**Unlit**	1. Make sure the you are using the Ethernet cable, not the DSL cable. The Ethernet cable is thicker than the standard telephone cable. 2. Make sure the Ethernet cable is securely plugged into the Ethernet jack on the PC. 3. Make sure the Ethernet cable is securely plugged into the Ethernet port on the Gateway. 4. Try another Ethernet cable if you have one available.

		5. Make sure you have Ethernet drivers installed on the PC. 6. Make sure the PC's TCP/IP Properties for the Ethernet Network Control Panel is set to obtain an IP address via DHCP. 7. Make sure the PC has obtained an address in the 192.168.1.x range. (You may have changed the subnet addressing.) 8. Make sure the PC is configured to access the Internet over a LAN. 9. Disable any installed network devices (Ethernet, HomePNA, wireless) that are not being used to connect to the Gateway.
DSL SYNC	**Unlit**	Launch a browser and try to browse the Internet. If the DSL SYNC light still does not flash, then proceed to "Advanced Troubleshooting" on page 104.

Factory Reset Switch

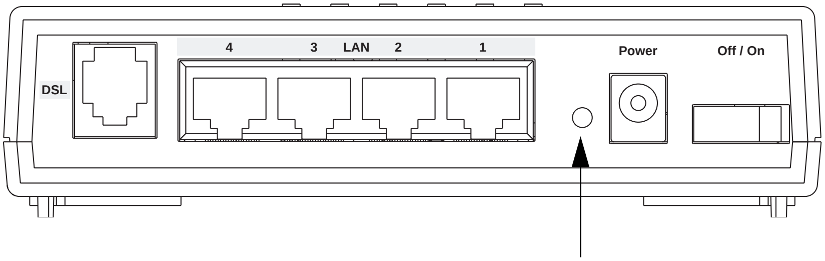
Lose your password? This section shows how to reset the Cayman 3346 so that you can access the configuration screens once again.

NOTE:

Keep in mind that all of your settings will need to be reconfigured.

If you don't have a password, the only way to access the Cayman 3346 is the following:

1. **Referring to the diagram below, find the round Reset Switch opening.**



Factory Reset Switch: Push to clear all settings

2. **Carefully insert the point of a pen or an unwound paperclip into the opening.**
3. **Press this switch.**
4. **This will reset the unit to factory defaults and you will now be able to reprogram the Cayman 3346.**

CHAPTER 4 Web-based User Interface

Using the Web-based user interface for the Netopia Cayman-series Gateway you can configure, troubleshoot, and monitor the status of your Gateway.

Overview of Major Capabilities

- "Feature Keys" on page 38

  Certain functionality in this release is controlled through software feature keys.
- "Wide Area Network Termination" on page 39

  The Gateway combines a traditional modem with an Internet router. It translates protocols used on the Internet to protocols used by home personal computers and eliminates the need for special desktop software (i.e. PPPoE).
- "Simplified Local Area Network Setup" on page 41

  Built-in DHCP and DNS proxy features minimize or eliminate the need to program any network configuration into your home personal computer.

- “Management” on page 42

  A Web server built into the Cayman Operating System makes setup and maintenance easy using standard browsers. Diagnostic tools facilitate troubleshooting.
- “IPMaps” on page 43

  IPMaps supports one-to-one Network Address Translation (NAT) for IP addresses assigned to servers, hosts, or specific computers on the LAN side of the Cayman Gateway.
- “Security” on page 43

  Network Address Translation (NAT), password protection, and other built-in security features prevent unauthorized remote access to your network. Pinholes, default server, and other features permit access to computers on your home network that you can specify.

Feature Keys

Certain functionality in this release is controlled through software feature keys. These keys are proprietary files with the following properties:

- They are specific to the serial number of the target unit.
- Once installed, and the Gateway restarted, the desired enhancement is enabled, which then allows full access to:
  - Configuration
  - Operation
  - Maintenance
  - Administration
- They will **not** enable the desired feature on a unit with the **wrong** serial number.

  They are rejected upon “Restart”, **not** when the file is downloaded.

Enhanced capabilities requiring a feature key include:

- BreakWater Basic Firewall
- SafeHarbour IPSec Tunnel Termination

NOTE:

Many Netopia Cayman-series Gateways ship with particular feature key sets pre-enabled. You can check the feature keys enabled on your Gateway in the System Status web page. See "System Status" on page 108.

Wide Area Network Termination

PPPoE/PPPoA (Point-to-Point Protocol over Ethernet/ATM). The PPPoE specification, incorporating the PPP and Ethernet standards, allows your computer(s) to connect to your Service Provider's network through your Ethernet WAN connection. The Cayman-series Gateway supports PPPoE/ PPPoA, eliminating the need to install PPPoE client software on any LAN computers.

Service Providers may require the use of PPP authentication protocols such as Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP). CHAP and PAP use a username and password pair to authenticate users with a PPP server.

A CHAP authentication process works as follows:

1. **The password is used to scramble a challenge string.**
2. **The password is a shared secret, known by both peers.**
3. **The unit sends the scrambled challenge back to the peer.**

PAP, a less robust method of authentication, sends a username and password to a PPP server to be authenticated. PAP's username and password pair are not encrypted, and therefore, sent "unscrambled".

Instant-On PPP. You can configure your Gateway for one of two types of Internet connections:

- Always On
- Instant On

These selections provide either a continuous Internet connection or an as-needed connection.

While an Always On connection is convenient, it does leave your network statically connected to the Internet, and therefore potentially vulnerable to attacks.

NOTE:

Although the Always On feature may be selected, there are no guarantees that the connection will never be interrupted.

Cayman's Instant On technology furnishes almost all the benefits of an Always-On connection while providing two additional security benefits:

- Your network cannot be attacked when it is not connected.
- Your network may change address with each connection making it more difficult to attack.

When you configure Instant On access, you can also configure an idle time-out value. Your Gateway monitors traffic over the Internet link and when there has been no traffic for the configured number of seconds, it disconnects the link.

When new traffic that is destined for the Internet arrives at the Gateway, the Gateway will instantly re-establish the link.

Your service provider may be using a system that assigns the Internet address of your Gateway out of a pool of many possible Internet addresses.

The address assigned varies with each connection attempt, which makes your network a moving target for any attacker.

Simplified Local Area Network Setup

DHCP (Dynamic Host Configuration Protocol) Server. DHCP Server functionality enables the Gateway to assign to your LAN computer(s) a “private” IP address and other parameters that allow network communication. The default DHCP Server configuration of the Gateway supports up to 16 LAN IP addresses.

This feature simplifies network administration because the Gateway maintains a list of IP address assignments. Additional computers can be added to your LAN without the hassle of configuring an IP address.

DNS Proxy. Domain Name System (DNS) provides end users with the ability to look for devices or web sites by typing their names, rather than IP addresses. For web surfers, this technology allows your to enter the URL (Universal Resource Locator) as text to surf to a desired website.

The Cayman DNS Proxy feature allows the LAN-side IP address of the Gateway to be used for proxying DNS requests from hosts on the LAN to the DNS Servers configured in the gateway. This is accomplished by having the Gateway's LAN address handed out as the “DNS Server” to the DHCP clients on the LAN.

NOTE:

The Cayman DNS Proxy only proxies UDP DNS queries, not TCP DNS queries.

Management

Embedded Web Server. There is no specialized software to install on your PC to configure, manage, or maintain your Cayman Gateway. Web pages embedded in the operating system provide access to the following Gateway operations:

- Setup
- System and security logs
- Diagnostics functions

Once you have removed your Cayman Gateway from its packing container and powered the unit up, use any LAN attached PC or workstation running a common web browser application to configure and monitor the Gateway.

Diagnostics. In addition to the Gateway's visual LED indicator lights, you can run an extensive set of diagnostic tools from your Web browser.

Two of the facilities are:

- Automated "Multi-Layer" Test

  The ***Run Diagnostics*** link initiates a sequence of tests. They examine the entire functionality of the Gateway, from the physical connections to the data traffic.

- Network Test Tools

  Two test tools to determine network reachability are available:

  Ping - tests the "reachability" of a particular network destination by sending an ICMP echo request and waiting for a reply.

  TraceRoute - displays the path to a destination by showing the number of hops and the router addresses of these hops.

  NSLookup - converts a domain name to its IP address and vice versa.

The system log also provides diagnostic information.

NOTE:

Your Service Provider may request information that you acquire from these various diagnostic tools. Individual tests may be performed at the command line. (See “Command Line Interface” on page 118.).

IPMaps

IPMaps supports one-to-one Network Address Translation (NAT) for IP addresses assigned to servers, hosts, or specific computers on the LAN side of the Cayman Gateway.

With IPMaps, a Service Provider-assigned static IP address is mapped to a specific internal device. This allows a LAN-located device to appear public without compromising other locally attached devices. The external IP addresses must be on the same subnet.

IPMaps is used for applications such as Web, email, and FTP servers.

See ***How To: Configure for IPMaps*** on page 52 for more information.

Security

Remote Access Control. You can determine whether or not an administrator or other authorized person has access to configuring your Gateway. This access can be turned on or off in the Web interface.

Password Protection. Access to your Cayman device can be controlled through two access control accounts, **Admin** or **User**.

- The **Admin**, or administrative user, performs all configuration, management or maintenance operations on the Gateway.

- The **User** account provides monitor capability **only**.
  A user may **NOT** change the configuration, perform upgrades or invoke maintenance functions.

Network Address Translation (NAT). The Cayman Gateway Network Address Translation (NAT) security feature lets you conceal the topology of a hard-wired Ethernet or wireless network connected to its LAN interface from routers on networks connected to its WAN interface. In other words, the end computer stations on your LAN are **invisible** from the Internet.

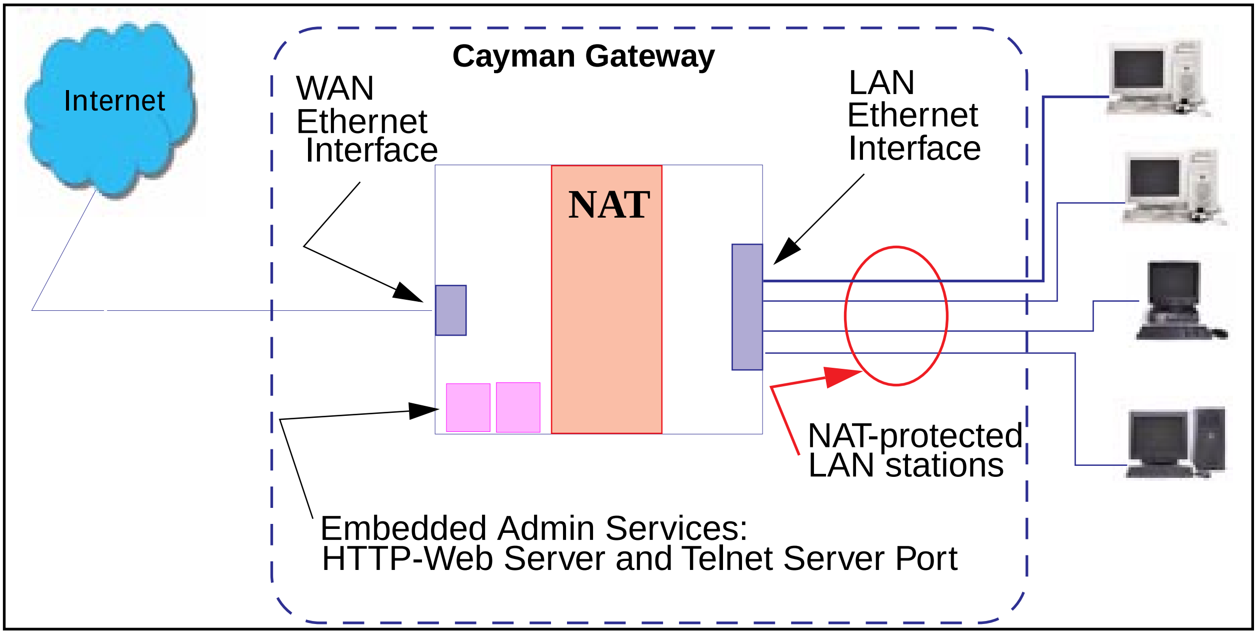
Only a **single WAN IP address** is required to provide this security support for your entire LAN.

LAN sites that communicate through an Internet Service Provider typically enable NAT, since they usually purchase only one IP address from the ISP.

- When NAT is **ON**, the Cayman Gateway “proxies” for the end computer stations on your network by pretending to be the originating host for network communications from non-originating networks. The WAN interface address is the only IP address exposed.

  The Cayman Gateway tracks which local hosts are communicating with which remote hosts. It routes packets received from remote networks to the correct computer on the LAN (Ethernet) interface.
- When NAT is **OFF**, a Cayman Gateway acts as a traditional TCP/IP router, all LAN computers/devices are exposed to the Internet.

A diagram of a typical NAT-enabled LAN follows:



NOTE:

1. The default setting for NAT is **ON**.
2. Cayman uses Port Address Translation (PAT) to implement the NAT facility.
3. NAT Pinhole traffic (discussed below) is always initiated from the WAN side.

Cayman Advanced Features for NAT. Using the NAT facility provides effective LAN security. However, there are user applications that require methods to selectively by-pass this security function for certain types of Internet traffic.

Cayman Gateways provide special pinhole configuration rules that enable users to establish NAT-protected LAN layouts that still provide flexible bypass capabilities.

Some of these rules require coordination with the unit’s embedded administration services: the internal Web (HTTP) Port (TCP 80) and the internal Telnet Server Port (TCP 23).

Internal Servers. The internal servers are the embedded Web and Telnet servers of the Gateway. You would change the internal server ports for Web and Telnet of the Gateway if you wanted to have these services on the LAN using pinholes or the Default server. Related to the pinhole configuration rules is an internal port forwarding facility that enables you to eliminate conflicts with embedded administrative ports 80 and 23.

Pinholes. This feature allows you to:

- Transparently route selected types of network traffic using the port forwarding facility.

  FTP requests or HTTP (Web) connections are directed to a specific host on your LAN.
- Setup multiple pinhole paths.

  Up to 32 paths are supported
- Identify the type(s) of traffic you want to redirect by port number.

Common TCP/IP protocols and ports are:

FTP (TCP 21)
SMTP (TCP 25)
SNMP (TCP 161, UDP 161)
telnet (TCP 23)
HTTP (TCP 80)

See page 68 for How To instructions.

Default Server. This feature allows you to:

- Direct your Gateway to forward all externally initiated IP traffic (TCP and UDP protocols only) to a default host on the LAN.
- Enable it for certain situations:

  Where you cannot anticipate what port number or packet protocol an in-bound application might use.
  For example, some network games select arbitrary port numbers when a connection is opened.

When you want all unsolicited traffic to go to a specific LAN host.

Combination NAT Bypass Configuration. Specific pinholes and Default Server settings, each directed to different LAN devices, can be used together.

WARNING:

Creating a pinhole or enabling a Default Server allows inbound access to the specified LAN station. Contact your Network Administrator for LAN security questions.

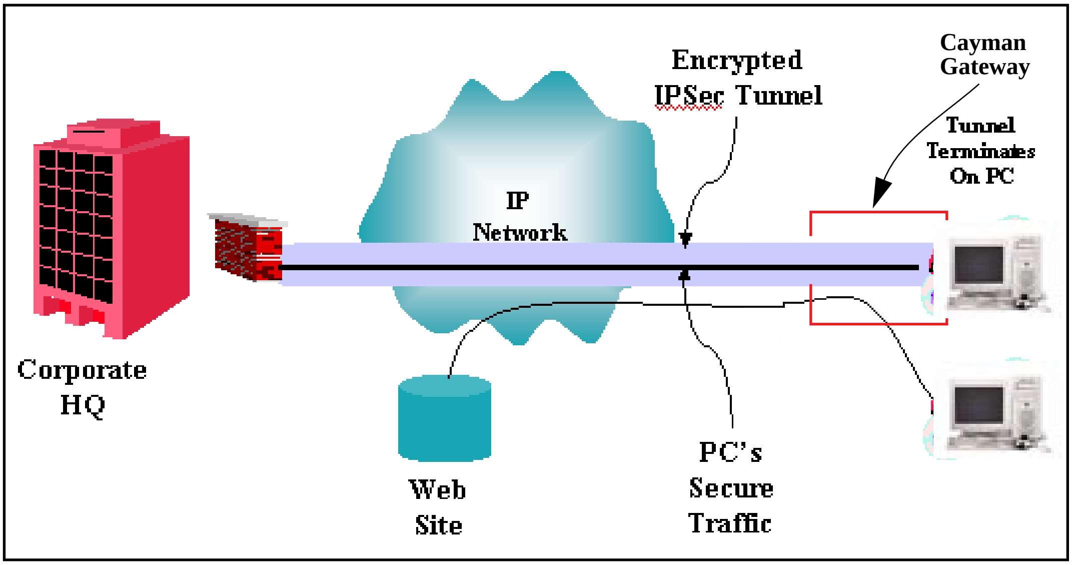
VPN IPSec Pass Through. This Cayman service supports your independent VPN client software in a transparent manner. Cayman has implemented an Application Layer Gateway (ALG) to support multiple PCs running IP Security protocols.

This feature has three elements:

1. **On power up or reset, the address mapping function (NAT) of the Gateway's WAN configuration is turned on by default.**
2. **When you use your third-party VPN application, the Gateway recognizes the traffic from your client and your unit. It allows the packets to pass through the NAT "protection layer" via the encrypted IPSec tunnel.**

3. **The encrypted IPSec tunnel is established “through” the Gateway.**

A typical VPN IPSec Tunnel pass through is diagrammed below:



NOTE:

Typically, no special configuration is necessary to use the IPSec pass through feature. This feature may need to be disabled for special VPN clients that are designed to be supported through NAT.

In the diagram, VPN PC clients are shown behind the Cayman Gateway and the secure server is at Corporate Headquarters across the WAN. You cannot have your secure server behind the Cayman Gateway.

When multiple PCs are starting IPSec sessions, they must be started one at a time to allow the associations to be created and mapped.

Access the Web UI

Open the Web Connection

Once your Gateway is powered up, you can use any recent version of the best-known web browsers such as Netscape Navigator or Microsoft Internet Explorer from any LAN-attached PC or workstation. The procedure is:

1. **Enter the name or IP address of your Cayman Gateway in the Web browser's window and press Return.**

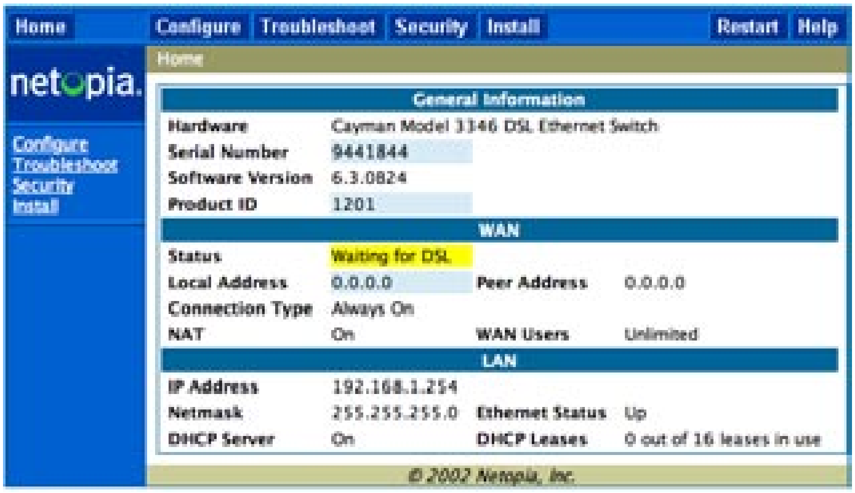
   For example, you would enter ***http://cayman***.

2. **If an administrator or user password has been assigned to the Cayman Gateway, enter *Admin* or *User* as the username and the appropriate password and click *OK*.**

   The Cayman Gateway Home Page opens.

Home Page

The Cayman Gateway Home Page is the expert summary page for your Cayman Gateway. The toolbar at the top provides links to controlling, configuring, and monitoring pages. Critical configuration and operational status is displayed in the center section.



General Information			
Hardware	Cayman Model 3346 DSL Ethernet Switch		
Serial Number	9441844		
Software Version	6.3.0824		
Product ID	1201		
WAN			
Status	Waiting for DSL		
Local Address	0.0.0.0	Peer Address	0.0.0.0
Connection Type	Always On		
NAT	On	WAN Users	Unlimited
LAN			
IP Address	192.168.1.254		
Netmask	255.255.255.0	Ethernet Status	Up
DHCP Server	On	DHCP Leases	0 out of 16 leases in use

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Home Page - Information

The Home page’s **center** section contains a **summary** of the Gateway’s configuration settings and operational status.

Summary Information	
Field	**Status and/or Description**
General Information	
Hardware	Model number and summary specification
Serial Number	Unique serial number, located on label attached to bottom of unit
Software Version	Release and build number of running Cayman Operating System.
Product ID	Refers to internal circuit board series; useful in determining which software upgrade applies to your hardware type.
WAN	
Status	Wide Area Network is either ***Up*** or ***Down***
Local Address	IP address assigned to the WAN port.
Connection Type	May be either ***Instant On*** or ***Always On***
NAT	***On*** or ***Off***. *ON* if using Network Address Translation to share the IP address across many LAN users.
Data Rate (Kbps)	Defines the Downstream (download) and Upstream (upload) rates that your connection is capable of.
Peer Address	The IP address of the router to which you are connected.
WAN Users	Displays the number of users allotted and the total number available for use.
LAN	
IP Address	Internal IP address of the Cayman Gateway.
Netmask	Defines the IP subnet for the LAN Default is 255.255.255.0 for a Class C device
DHCP Server	***On*** or ***Off***. *ON* if using DHCP to get IP addresses for your LAN client machines.
Ethernet Status	Local Area Network (Ethernet) is either ***Up*** or ***Down***
DHCP Leases	A “lease” is held by each LAN client that has obtained an IP address through DHCP.

Toolbar

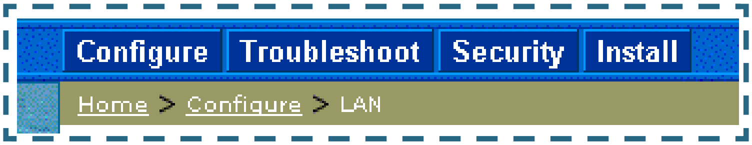
The toolbar is the dark blue bar at the top of the page containing the major navigation buttons. These buttons are available from almost every page, allowing you to move freely about the site.

Home	Configure	Troubleshoot	Security	Install	Restart	Help
	Quickstart	System Status	Passwords	Install Software		
	LAN	Network Tools				
	WAN	Diagnostics				
	Advanced					

Navigating the Web Interface

Link: Breadcrumb Trail

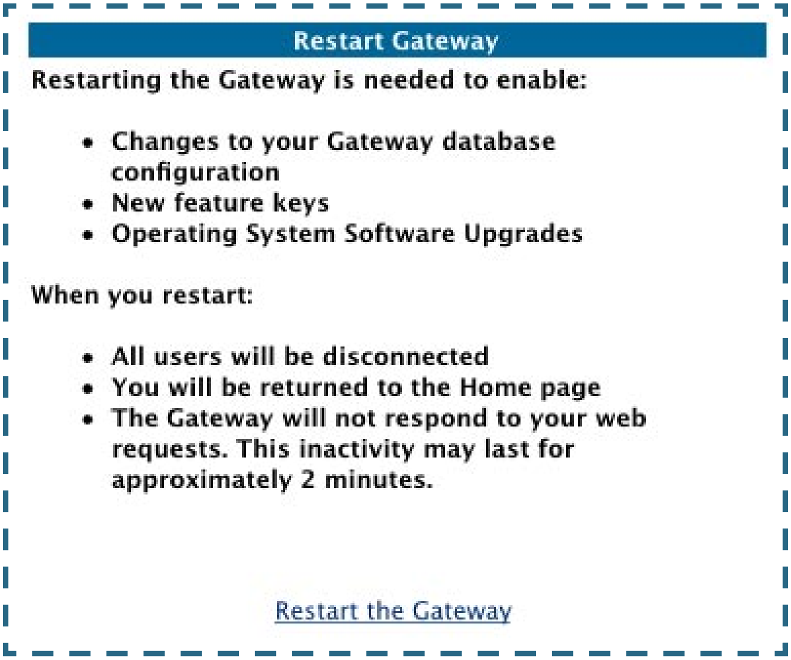
The breadcrumb trail is built in the light brown area beneath the toolbar. As you navigate down a path within the site, the trail is built from left to right. To return anywhere along the path from which you came, click on one of the links.



Restart

Button: Restart

The Restart button on the toolbar allows you to restart the Gateway at any time. You will be prompted to confirm the restart before any action is taken. The Restart Confirmation message explains the consequences of and reasons for restarting the Gateway



Restart Gateway

Restarting the Gateway is needed to enable:

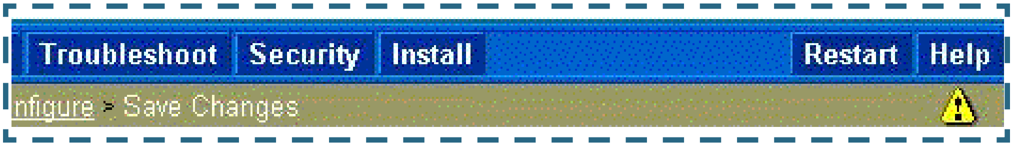
- Changes to your Gateway database configuration
- New feature keys
- Operating System Software Upgrades

When you restart:

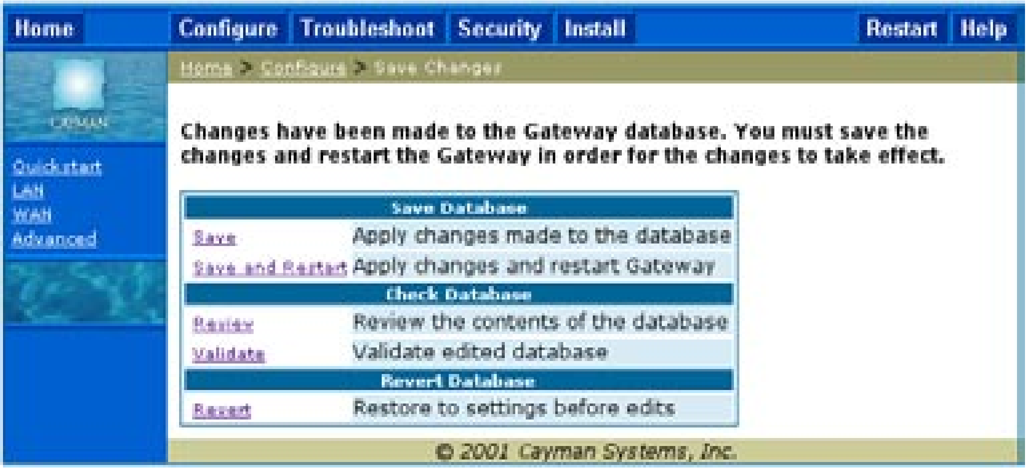
- All users will be disconnected
- You will be returned to the Home page
- The Gateway will not respond to your web requests. This inactivity may last for approximately 2 minutes.

Link: Alert Symbol

The Alert symbol appears in the upper right corner if you make a database change; one in which a change is made to the Gateway’s configuration. The Alert serves as a reminder that you must **Save** the changes and **Restart** the Gateway before the change will take effect. You can make many changes on various pages, and even leave the browser for up to 8 minutes, but if the Gateway is restarted before the changes are applied, they will be lost. When you click on the Alert symbol, the Save Changes page appears. Here you can select various options to save or discard these changes.



If more than one Alert is triggered, you will need to take action to clear the first Alert before you can see the second Alert.



Quickstart
LAN
WAN
Advanced

Changes have been made to the Gateway database. You must save the changes and restart the Gateway in order for the changes to take effect.

Save Database	
Save	Apply changes made to the database
Save and Restart	Apply changes and restart Gateway
Check Database	
Review	Review the contents of the database
Validate	Validate edited database
Revert Database	
Revert	Restore to settings before edits

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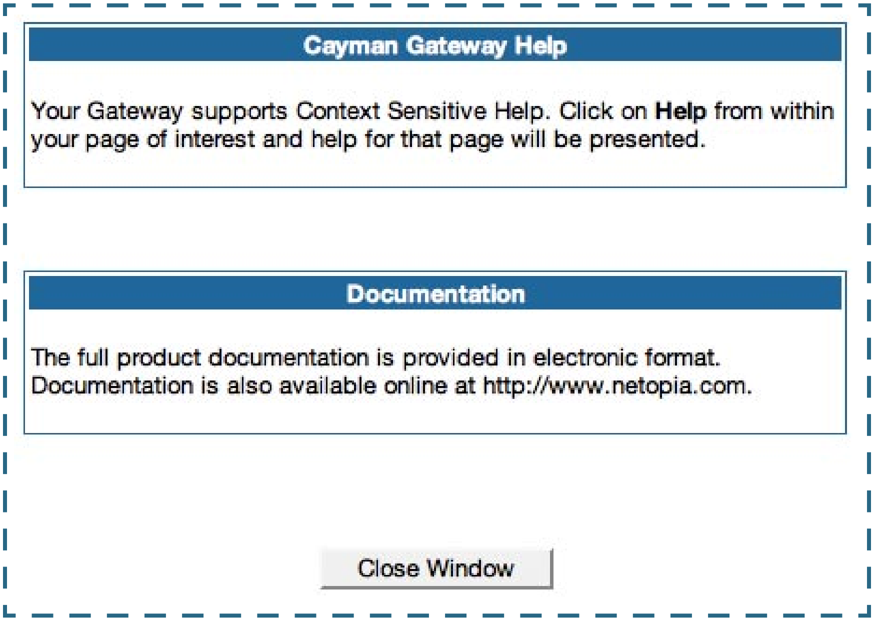
Help

Button: Help

Context-sensitive Help is provided in CaymanOS. The page shown above is displayed when you are on the Home page or other transitional pages. To see a context help page example, go to ***Security -> Passwords***, then click ***Help***.



Cayman Gateway Help

Your Gateway supports Context Sensitive Help. Click on **Help** from within your page of interest and help for that page will be presented.

Documentation

The full product documentation is provided in electronic format. Documentation is also available online at http://www.netopia.com.

Configure

Button: Configure

The Configuration options are presented in the order of likelihood you will need to use them. **Quickstart** is typically accessed during the hardware installation and initial configuration phase. **Often, these settings should be changed only in accordance with information from your Service Provider. LAN** and **WAN** settings are available to fine-tune your system. **Advanced** provides some special capabilities typically used for gaming or small office environments, or where LAN-side servers are involved.

This button will not be available if you log on as *User*.

Quickstart

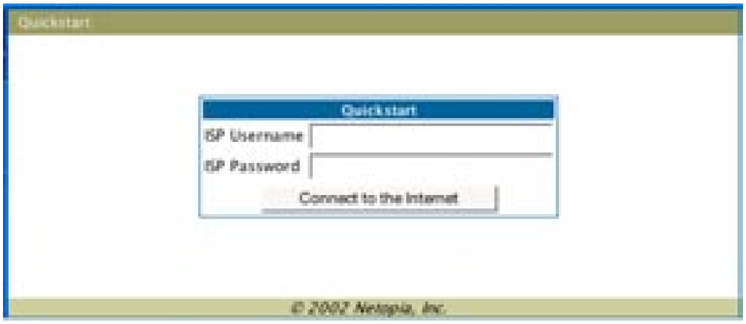
How to Use the Quickstart Page. Quickstart is normally used immediately after the new hardware is installed. When you are first configuring your Gateway, Quickstart appears first.

(Once you have configured your Gateway, logging on displays the Home page. Thereafter, if you need to use Quickstart, choose it from the Configure menu.)

Link: Configure -> Quickstart

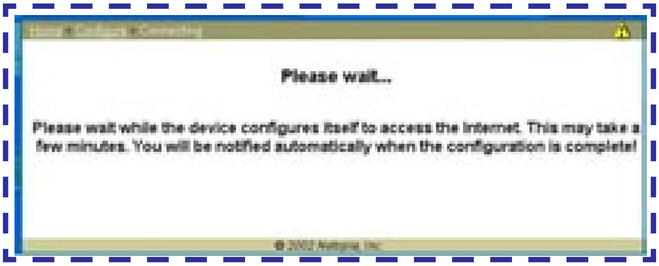
Setup Your Gateway using a PPP Connection.

This example screen is the for a **PPP Quickstart** configuration. Your gateway authenticates with the Service Provider equipment using the ISP Username and Password. These values are given to you by your Service Provider.



1. **Enter your ISP Username and ISP Password.**
2. **Click *Connect to the Internet*.**

A brief message is displayed while the Gateway attempts to establish a connection.



Please wait...

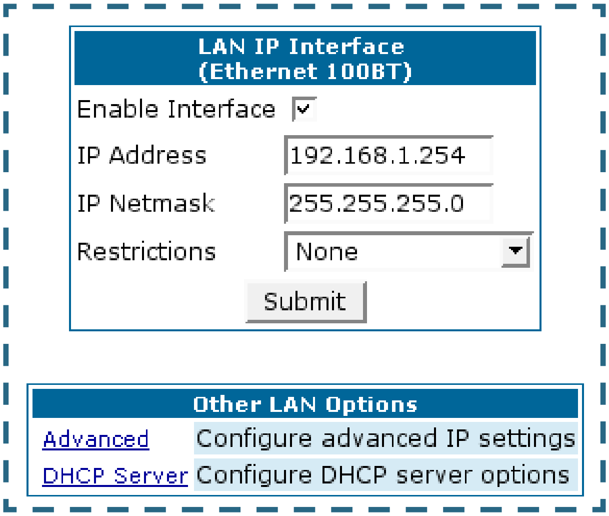
Please wait while the device configures itself to access the Internet. This may take a few minutes. You will be notified automatically when the configuration is complete!

3. **When the connection succeeds, your browser will display your Service Provider’s home page.**

If you encounter any problems connecting, refer to the chapters “Basic Troubleshooting” on page 32 or “Advanced Troubleshooting” on page 104.

LAN

Link: Configure -> LAN



LAN IP Interface
(Ethernet 100BT)

Enable Interface ☑

IP Address 192.168.1.254

IP Netmask 255.255.255.0

Restrictions None

Other LAN Options	
Advanced	Configure advanced IP settings
DHCP Server	Configure DHCP server options

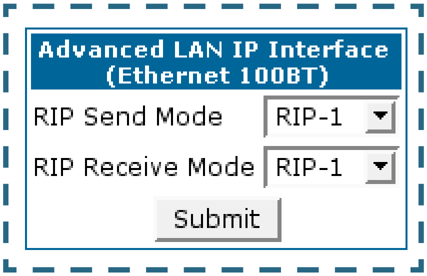
*** Interface Enable**: Enables all LAN-connected computers to share resources and to connect to the WAN. The Interface should always be enabled unless you are instructed to disable it by your Service Provider during troubleshooting.

*** IP Address**: The LAN IP Address of the Gateway. The IP Address you assign to your LAN interface must not be used by another device on your LAN network.

*** IP Netmask**: Specifies the subnet mask for the TCP/IP network connected to the virtual circuit. The subnet mask specifies which bits of the 32-bit binary IP address represent network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask.)

*** Restrictions**: Specifies whether an administrator can open a Web Administrator or Telnet connection to the Gateway over the LAN interface in order to monitor and configure the Gateway. On the LAN Interface, you can enable or disable administrator access. By default, administrative restrictions are turned off, meaning an administrator can open a Web Administrator or Telnet connection through the LAN Interface.

• **Advanced**: Clicking on the Advanced link displays the Advanced LAN IP Interface page.



Advanced LAN IP Interface (Ethernet 100BT)

RIP Send Mode: RIP-1

RIP Receive Mode: RIP-1

- RIP Send Mode: Specifies whether the gateway should use Routing Information Protocol (RIP) broadcasts to advertise its routing tables to other routers on your network. You may choose from the following protocols:
  - RIP-1: Routing Information Protocol version 1
  - RIP-2: RIP Version 2 is an extension of the original Routing Information Protocol (RIP-1) that expands the amount of useful information in the RIP packets. While RIP-1 and RIP-2 share the same basic algorithms, RIP-2 supports several new features, including inclusion of subnet masks in RIP packets and implementation of multicasting instead of broadcasting (which reduces the load on hosts which do not support routing protocols.
- RIP Receive Mode: Specifies whether the Gateway should use Routing Information Protocol (RIP) broadcasts to update its routing tables with information received from other routers on your network. The protocol choices are the same as for the RIP send mode.

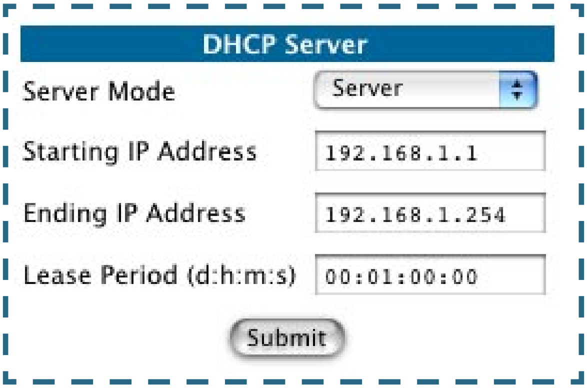
- **DHCP Server**: Your Gateway can provide network configuration information to computers on your LAN, using the Dynamic Host Configuration Protocol (DHCP).

If you already have a DHCP server on your LAN, you should turn this service off.

If you want the Gateway to provide this service, click the ***Server Mode*** pull-down menu, then configure the range of IP addresses that you would like the Gateway to hand out to your computers.

You can also specify the length of time the computers can use the configuration information; DHCP calls this period the lease time.

Your Service Provider may, for certain services, want to provide configuration from its DHCP servers to the computers on your LANs. In this case, the Gateway will relay the DHCP requests from your computers to a DHCP server in the Service Provider's network. Click the relay-agent and enter the IP address of the Service Provider's DHCP server in the Server Address field. This address is furnished by the Service Provider.



DHCP Server

Server Mode: Server

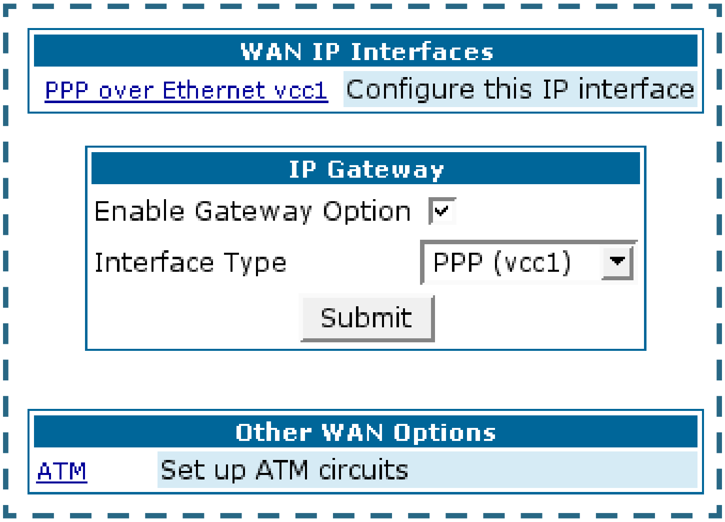
Starting IP Address: 192.168.1.1

Ending IP Address: 192.168.1.254

Lease Period (d:h:m:s): 00:01:00:00

WAN

Link: Configure -> WAN



WAN IP Interfaces

PPP over Ethernet vcc1	Configure this IP interface

IP Gateway

Enable Gateway Option ☑

Interface Type: PPP (vcc1)

Other WAN Options

ATM	Set up ATM circuits

WAN IP Interfaces

Your IP interfaces are listed. Click on an interface to configure it.

IP Gateway

Enable Gateway: You can configure the Gateway to send packets to a default gateway if it does not know how to reach the destination host.

Interface Type: If you have PPPoE enabled, you can specify that packets destined for unknown hosts will be sent to the gateway being used by the remote PPP peer. If you select ip-address, you must enter the IP address of a host on a local or remote network to receive the traffic.

Default Gateway: The IP Address of the default gateway.

Other WAN Options

PPPoE: You can enable or disable PPPoE. This link also allows configuration of NAT, admin restrictions, PPPoE username/password, and connection type.

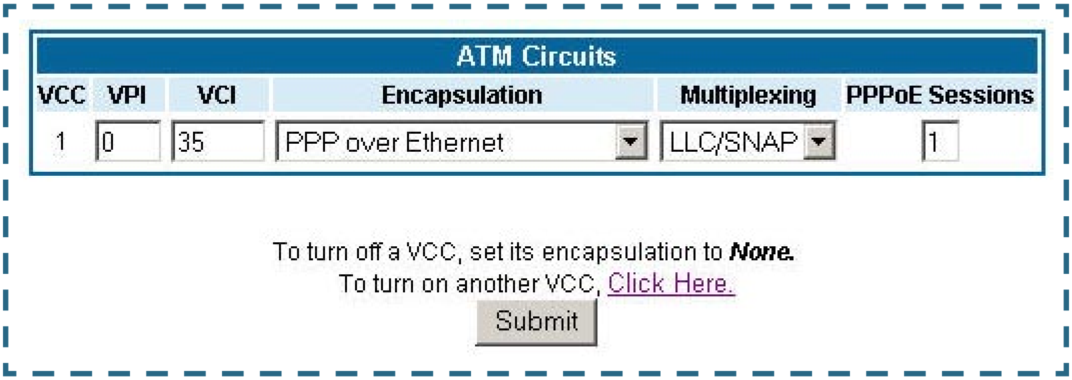
ATM: You can configure the ATM circuits and the number of Sessions. The IP Interface(s) should be reconfigured after making changes here.

Multiple VCs

Link: Other WAN Options: ATM

With the Tiered Operating System introduced in COS 6.3, Service Providers may offer their users a choice of 1, 3, or 8 PPPoE sessions as well as up to 8 VPI/VCIs for a single virtual circuit.

This page brings the user to the *ATM Circuits* page where you can select the following parameters: VPI, VCI, Encapsulation, and Multiplexing type



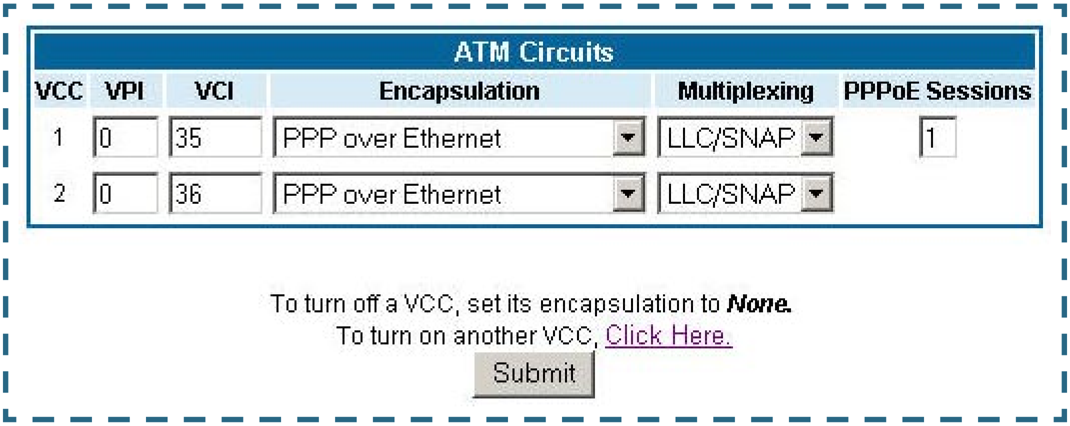
ATM Circuits

VCC	VPI	VCI	Encapsulation	Multiplexing	PPPoE Sessions
1	0	35	PPP over Ethernet	LLC/SNAP	1

To turn off a VCC, set its encapsulation to ***None.***
To turn on another VCC, Click Here.

To add a VC, click the ***Click Here*** link.

A second (or subsequent) line of parameters appears, where you can specify alternative values for each VCC.



ATM Circuits

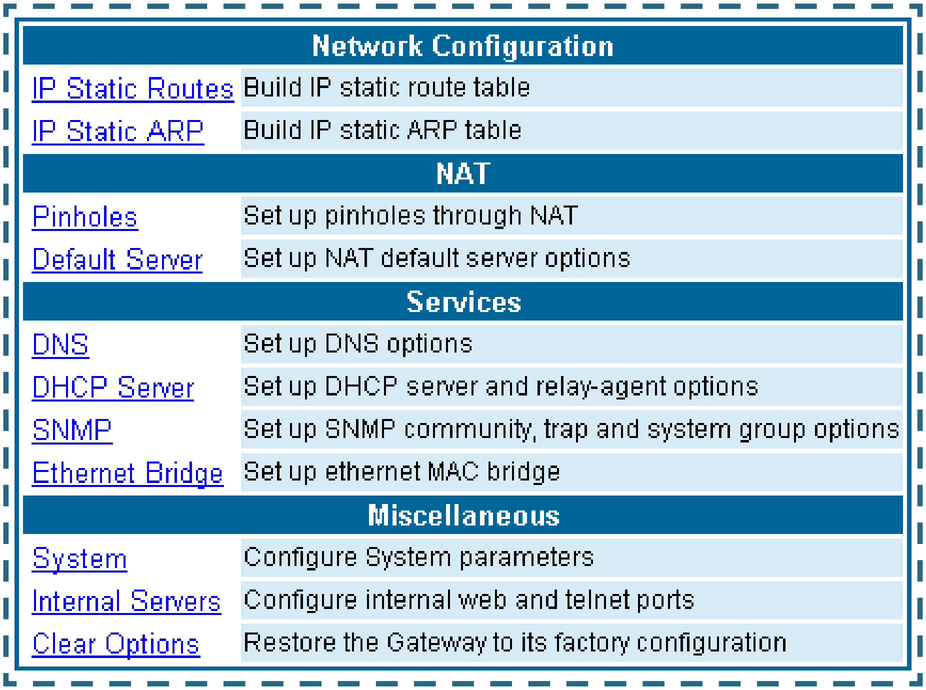
VCC	VPI	VCI	Encapsulation	Multiplexing	PPPoE Sessions
1	0	35	PPP over Ethernet	LLC/SNAP	1
2	0	36	PPP over Ethernet	LLC/SNAP	

To turn off a VCC, set its encapsulation to ***None.***

To turn on another VCC, Click Here.

Advanced

The following are links under Configure -> Advanced:



Network Configuration	
IP Static Routes	Build IP static route table
IP Static ARP	Build IP static ARP table
NAT	
Pinholes	Set up pinholes through NAT
Default Server	Set up NAT default server options
Services	
DNS	Set up DNS options
DHCP Server	Set up DHCP server and relay-agent options
SNMP	Set up SNMP community, trap and system group options
Ethernet Bridge	Set up ethernet MAC bridge
Miscellaneous	
System	Configure System parameters
Internal Servers	Configure internal web and telnet ports
Clear Options	Restore the Gateway to its factory configuration

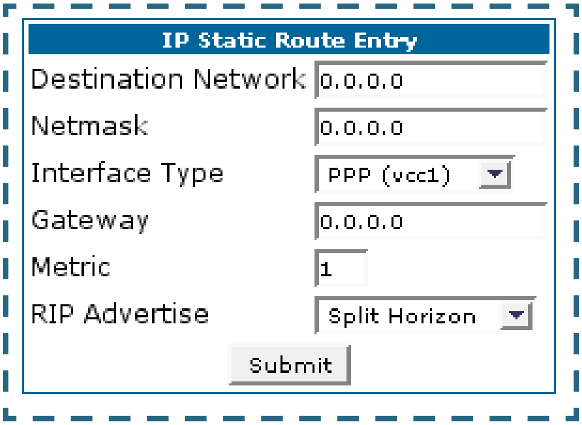
Link: Advanced

Selected Advanced options are discussed in the pages that follow. Many are self-explanatory or are dictated by your service provider.

Link: IP Static Routes

A static route identifies a manually configured pathway to a remote network. Unlike dynamic routes, which are acquired and confirmed periodically from other routers, static routes do not time out. Consequently, static routes are useful when working with PPP, since an intermittent PPP link may make maintenance of dynamic routes problematic.

You can configure as many as 16 static IP routes for the Gateway.

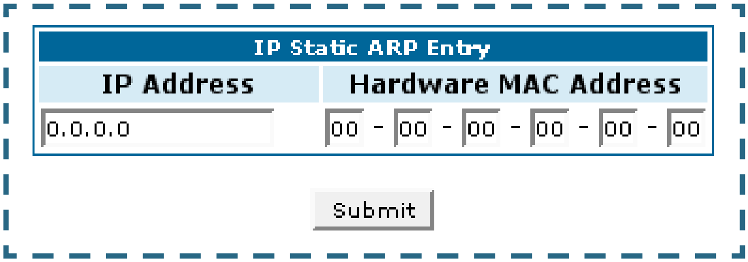


IP Static Route Entry

Destination Network	0.0.0.0
Netmask	0.0.0.0
Interface Type	PPP (vcc1)
Gateway	0.0.0.0
Metric	1
RIP Advertise	Split Horizon

Link: IP Static ARP

Your Gateway maintains a dynamic Address Resolution Protocol (ARP) table to map IP addresses to Ethernet (MAC) addresses. It populates this ARP table dynamically, by retrieving IP address/MAC address pairs only when it needs them. Optionally, you can define static ARP entries to map IP addresses to their corresponding Ethernet MAC addresses. Unlike dynamic ARP table entries, static ARP table entries do not time out. The IP address cannot be 0.0.0.0. The Ethernet MAC address entry is in nn-nn-nn-nn-nn-nn (hexadecimal) format.

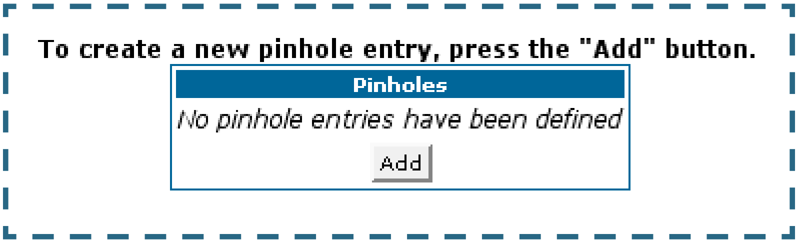


IP Static ARP Entry	
IP Address	Hardware MAC Address
0.0.0.0	00 - 00 - 00 - 00 - 00 - 00

Link: Pinholes

Pinholes allow you to transparently route selected types of network traffic, such as FTP requests or HTTP (Web) connections, to a specific host behind the Gateway. Creating a pinhole allows access traffic originating from a remote connection (WAN) to be sent to the internal computer (LAN) that is specified in the Pinhole page.

Pinholes are common for applications like multiplayer online games. Refer to software manufacturer application documentation for specific traffic types and port numbers.



To create a new pinhole entry, press the "Add" button.

Pinholes
No pinhole entries have been defined

Configure Specific Pinholes. Planning for Your Pinholes. Determine if any of the service applications that you want to provide on your LAN stations use TCP or UDP protocols. If an application does, then you must configure a pinhole to implement port forwarding. This is accessed from the **Advanced -> Pinholes** page.

Example: A LAN Requiring Three Pinholes . The procedure on the following pages describes how you set up your NAT-enabled Cayman Gateway to support three separate applications. This requires passing three kinds of specific IP traffic through to your LAN.

Application 1: You have a Web server located on your LAN behind your Cayman Gateway and would like users on the Internet to have access to it. With NAT "On", the only externally visible IP address on your network is the Gateway's WAN IP (supplied by your Service Provider). All traffic intended for that LAN Web server must be directed to that IP address.

Application 2: You want one of your LAN stations to act as the "central repository" for all email for all of the LAN users.

Application 3: One of your LAN stations is specially configured for game applications. You want this specific LAN station to be dedicated to games.

A sample table to plan the desired pinholes is:

WAN Traffic Type	Protocol	Pinhole Name	LAN Internal IP Address
Web	TCP	my-webserver	192.168.1.1
Email	TCP	my-mailserver	192.168.1.2
Games	UDP	my-games	192.168.1.3

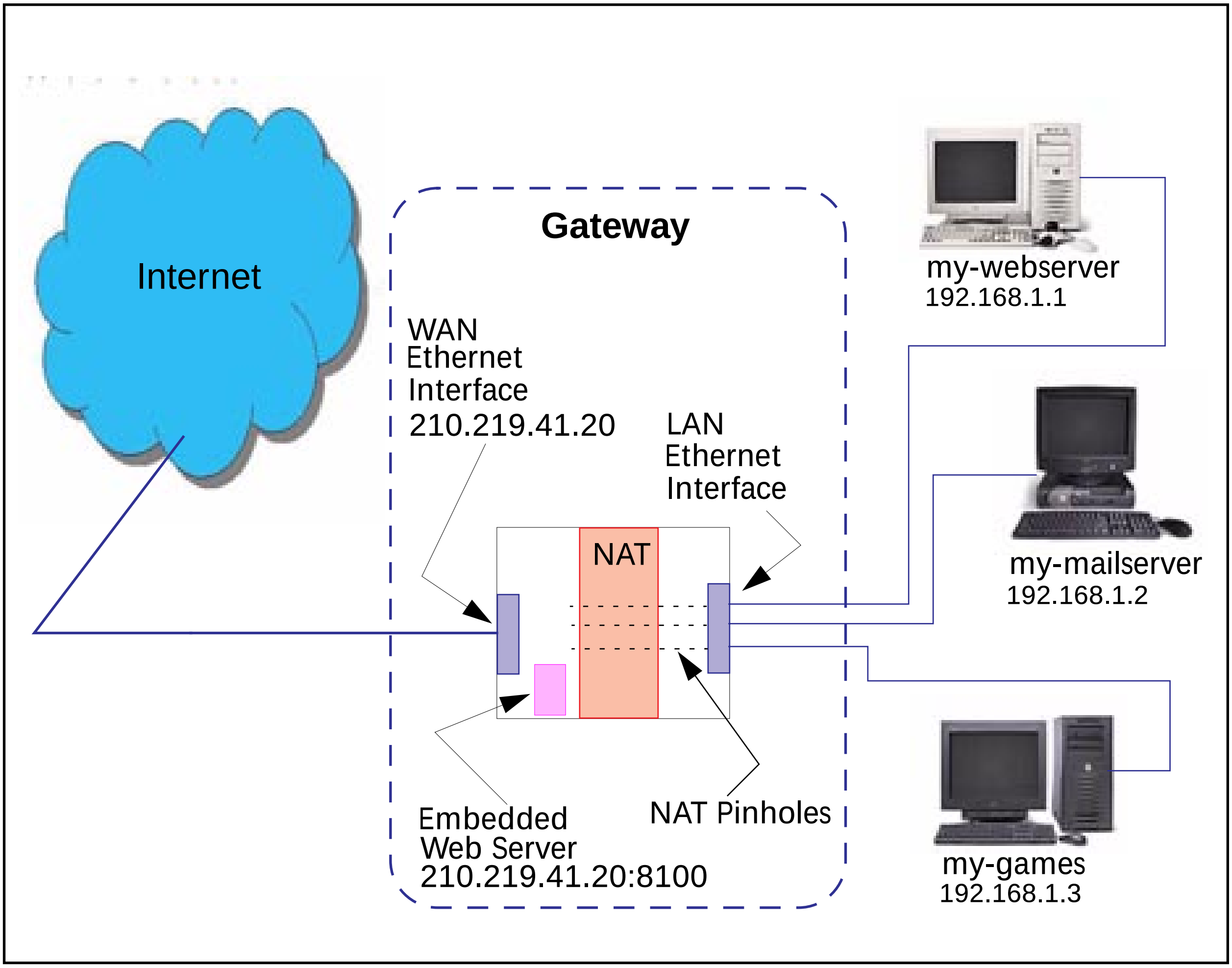
For this example, Internet protocols TCP and UDP must be passed through the NAT security feature and the Gateway's embedded Web (HTTP) port must be re-assigned by configuring new settings on the Internal Servers page.

☞

TIPS for making Pinhole Entries:

1. If the port forwarding feature is required for Web services, ensure that the embedded Web server’s port number is re-assigned PRIOR to any Pinhole data entry.
2. Enter data for one Pinhole at a time.
3. Use a unique name for each Pinhole. If you choose a duplicate name, it will overwrite the previous information without warning.

A diagram of this LAN example is:



Pinhole Configuration Procedure. Use the following steps:

1. **From the *Configure* toolbar button -> *Advanced* link, select the *Internal Servers* link.**

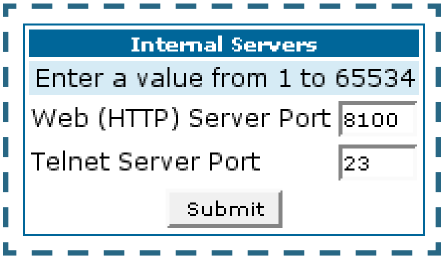
   Since Port Forwarding is required for this example, the Cayman embedded Web server is configured first.

NOTE:

The two text boxes, **Web (HTTP) Server Port** and **Telnet Sever Port**, on this page refer to the port numbers of the Cayman Gateway's ***embedded administration ports***.

To pass Web traffic through to your LAN station(s), select a Web (HTTP) Port number that is greater than 1024. In this example, you choose 8100.

2. **Type *8100* in the Web (HTTP) Server Port text box.**



Internal Servers

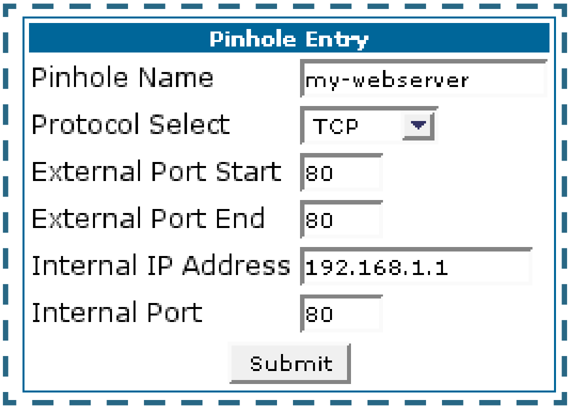
Enter a value from 1 to 65534

Web (HTTP) Server Port 8100

Telnet Server Port 23

3. **Click the *Submit* button.**
4. **Click *Advanced*. Select the *Pinholes* link to go to the Pinhole page.**

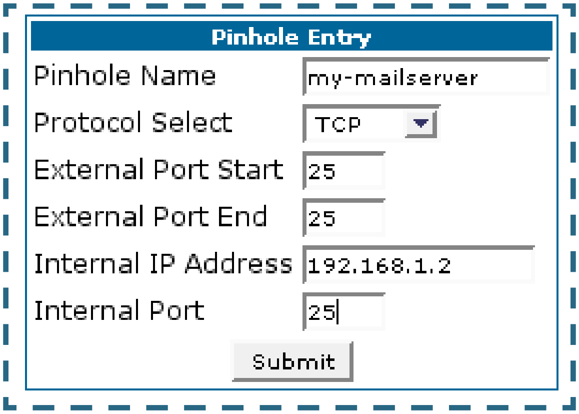
5. **Click *Add*. Type your specific data into the Pinhole Entries table of this page. Click *Submit*.**



Pinhole Entry

Pinhole Name	my-webserver
Protocol Select	TCP
External Port Start	80
External Port End	80
Internal IP Address	192.168.1.1
Internal Port	80

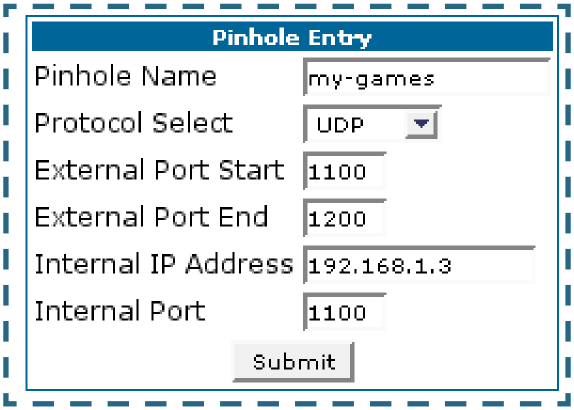
6. **Click on the *Pinholes* link in the Breadcrumb Trail to go to the Pinholes entry page. Click *Add*. Add the next Pinhole. Type the specific data for the second Pinhole.**



Pinhole Entry

Pinhole Name	my-mailserver
Protocol Select	TCP
External Port Start	25
External Port End	25
Internal IP Address	192.168.1.2
Internal Port	25

7. **Click on the *Pinholes* link in the Breadcrumb Trail to go to the Pinholes entry page. Click the *Add*. Add the next Pinhole. Type the specific data for the third Pinhole.**



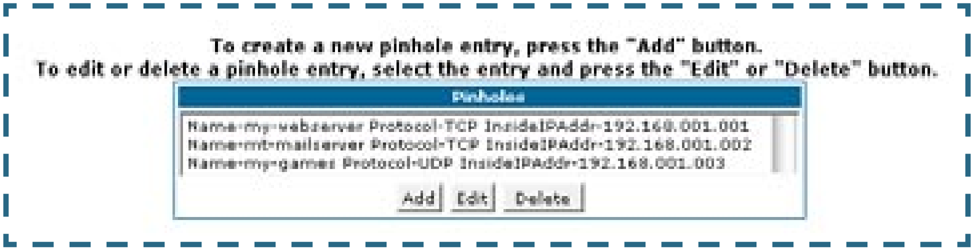
Pinhole Entry

Pinhole Name	my-games
Protocol Select	UDP
External Port Start	1100
External Port End	1200
Internal IP Address	192.168.1.3
Internal Port	1100

NOTE:

Note the following parameters for the “my-games” Pinhole:
1. The Protocol ID is UDP.
2. The external port is specified as a range.
3. The Internal port is specified as the lower range entry.

8. **Click on the *Pinholes* link in the Breadcrumb Trail to go to the Pinholes entry page. Review your entries to be sure they are correct.**



To create a new pinhole entry, press the "Add" button.
To edit or delete a pinhole entry, select the entry and press the "Edit" or "Delete" button.

Pinholes

```
Name=my-webserver Protocol=TCP InsideIPAddr=192.168.001.001
Name=mt-mailserver Protocol=TCP InsideIPAddr=192.168.001.002
Name=my-games Protocol=UDP InsideIPAddr=192.168.001.003
```

9. **Click the *Alert* button.**
10. **Select the *Save and Restart* link to complete the entire Pinhole creation task and ensure that the parameters are properly saved.**

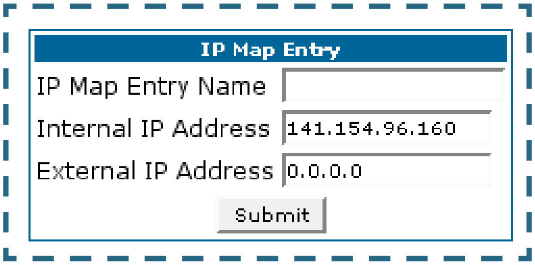
NOTE:

REMEMBER: When you have re-assigned the port address for the embedded Web server, you can still access this facility.
Use the Gateway's WAN address plus the new port number.
In this example it would be
<WAN Gateway address>:<new port number> or, in this case,
210.219.41.20:8100

Link: IPMaps

IPMaps supports one-to-one Network Address Translation (NAT) for IP addresses assigned to servers, hosts, or specific computers on the LAN side of the Cayman Gateway.

A single static or dynamic (DHCP) WAN IP address must be assigned to support other devices on the LAN. These devices utilize Cayman's default NAT/PAT capabilities.



IP Map Entry

IP Map Entry Name

Internal IP Address 141.154.96.160

External IP Address 0.0.0.0

Configure the IPMaps Feature

FAQs for the IPMaps Feature

Before configuring an example of an IPMaps-enabled network, review these frequently asked questions.

What are IPMaps and how are they used? The IPMaps feature allows multiple static WAN IP addresses to be assigned to the Cayman Gateway.

Static WAN IP addresses are used to support specific services, like a web server, mail server, or DNS server. This is accomplished by mapping a separate static WAN IP address to a specific internal LAN IP address. All traffic arriving at the Gateway intended for the static IP address is transferred to the internal device. All outbound traffic from the internal device appears to originate from the static IP address.

Locally hosted servers are supported by a public IP address while LAN users behind the NAT-enabled IP address are protected.

IPMaps is compatible with the use of NAT, with either a statically assigned IP address or DHCP/PPP served IP address for the NAT table.

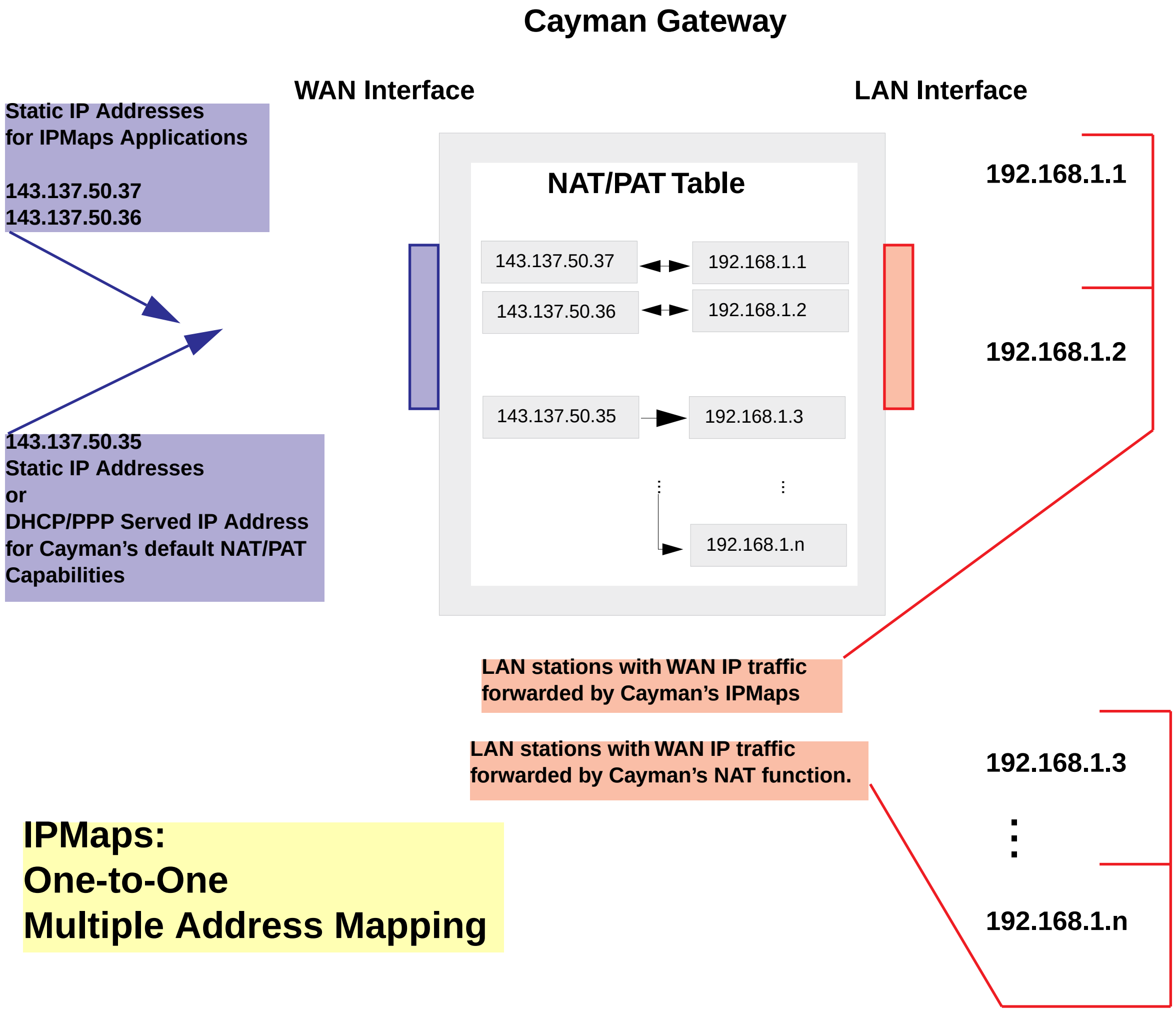
What types of servers are supported by IPMaps? IPMaps allows a Cayman Gateway to support servers behind the Gateway, for example, web, mail, FTP, or DNS servers. VPN servers are not supported at this time.

Can I use IPMaps with my PPPoE or PPPoA connection? Yes. IPMaps can be assigned to the WAN interface **provided they are on the same subnet**. Service providers will need to ensure proper routing to all IP addresses assigned to your WAN interface.

Will IPMaps allow IP addresses from different subnets to be assigned to my Gateway? IPMap will support statically assigned WAN IP addresses from the **same** subnet.

WAN IP addresses from different subnets are **not supported**.

IPMaps Block Diagram. The following diagram shows the IPMaps principle in conjunction with existing Cayman NAT operations:



Link: Default Server

This feature allows you to:

- Direct your Gateway to forward all externally initiated IP traffic (TCP and UDP protocols only) to a default host on the LAN.
- Enable it for certain situations:

  – Where you cannot anticipate what port number or packet protocol an inbound application might use. For example, some network games select arbitrary port numbers when a connection is opened.

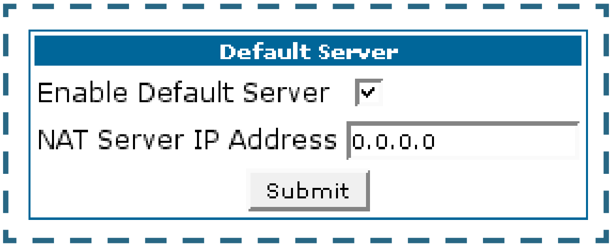
  – When you want all unsolicited traffic to go to a specific LAN host.

Configure a Default Server. This feature allows you to direct unsolicited or non-specific traffic to a designated LAN station. With NAT "On" in the Gateway, these packets normally would be discarded.

For instance, this could be application traffic where you don't know (in advance) the port or protocol that will be used. Some game applications fit this profile.

Use the following steps to setup a NAT default server to receive this information:

1. **Select the *Configure* toolbar button, then *Advanced*, then the *Default Server* link.**
2. **Check the *Enable Default Server* checkbox. The NAT Server IP Address field appears.**



Default Server

Enable Default Server ☑

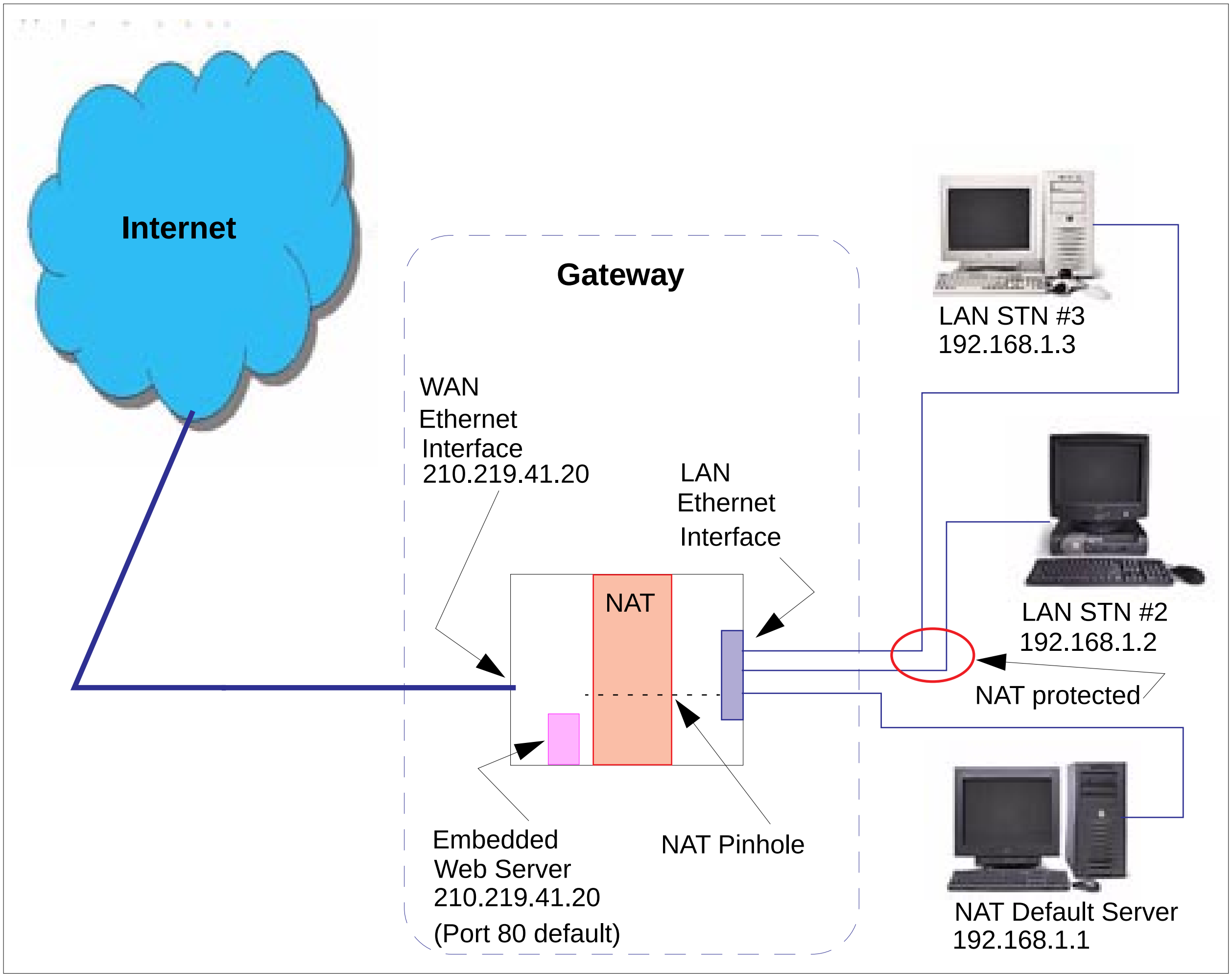
NAT Server IP Address 0.0.0.0

3. **Determine the IP address of the LAN computer you have chosen to receive the unexpected or unknown traffic.**

   Enter this address in the NAT Server IP Address field.

4. **Click the *Submit* button.**
5. **Click the *Alert* button.**
6. **Click the *Save and Restart* link to confirm.**

Typical Network Diagram. A typical network using the NAT Default Server looks like this:


Internet
Gateway
WAN Ethernet Interface 210.219.41.20
LAN Ethernet Interface
NAT
Embedded Web Server 210.219.41.20 (Port 80 default)
NAT Pinhole
LAN STN #3 192.168.1.3
LAN STN #2 192.168.1.2
NAT protected
NAT Default Server 192.168.1.1

NAT Combination Application. Cayman's NAT security feature allows you to configure a sophisticated LAN layout that uses both the Pinhole and Default Server capabilities.

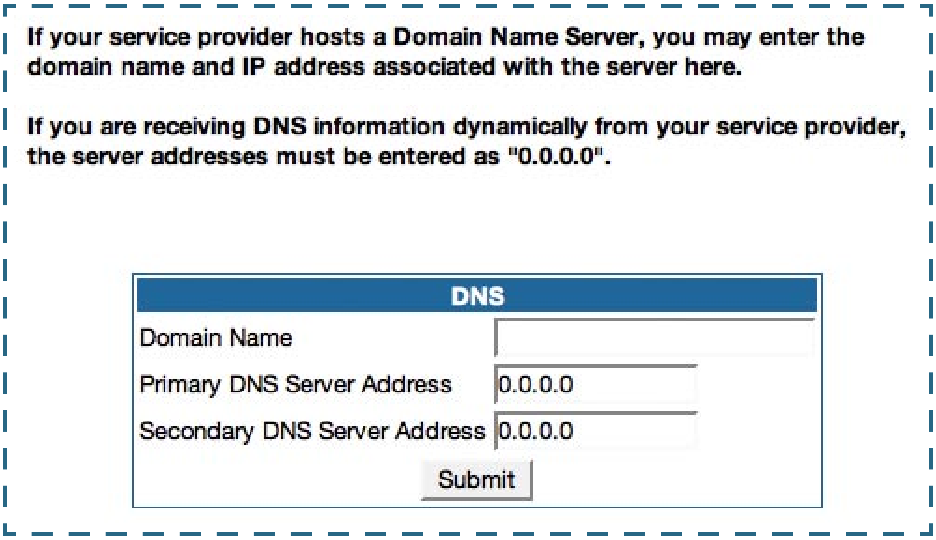
With this topology, you configure the embedded administration ports as a first task, followed by the Pinholes and, finally, the NAT Default Server.

When using both NAT pinholes and NAT Default Server the Gateway works with the following rules (in sequence) to forward traffic from the Internet to the LAN:

1. **If the packet is a response to an existing connection created by outbound traffic from a LAN PC, forward to that station.**
2. **If not, check for a match with a pinhole configuration and, if one is found, forward the packet according to the pinhole rule.**
3. **If there's no pinhole, the packet is forwarded to the Default Server.**

Link: DNS

Your Service Provider may maintain a Domain Name server. If you have the information for the DNS servers, enter it on the DNS page. If your Gateway is configured to use DHCP to obtain its WAN IP address, the DNS information is automatically obtained from that same DHCP Server.



If your service provider hosts a Domain Name Server, you may enter the domain name and IP address associated with the server here.

If you are receiving DNS information dynamically from your service provider, the server addresses must be entered as "0.0.0.0".

DNS

Domain Name	
Primary DNS Server Address	0.0.0.0
Secondary DNS Server Address	0.0.0.0

Link: DHCP Server

Your Gateway can provide network configuration information to computers on your LAN, using the Dynamic Host Configuration Protocol (DHCP).

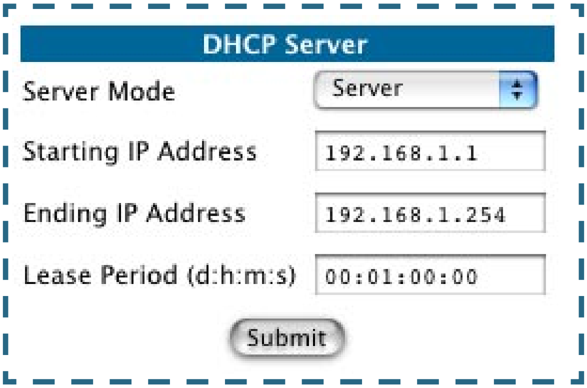
If you already have a DHCP server on your LAN, you should turn this service off.

If you want the Gateway to provide this service, click the ***Server Mode*** pull-down menu, then configure the range of IP addresses that you would like the Gateway to hand out to your computers.

You can also specify the length of time the computers can use the configuration information; DHCP calls this period the lease time.

Your Service Provider may, for certain services, want to provide configuration from its DHCP servers to the computers on your LANs. In this case, the Gateway will relay the DHCP requests from your computers to a DHCP server in the Service Provider's network.

Click the relay-agent and enter the IP address of the Service Provider's DHCP server in the Server Address field. This address is furnished by the Service Provider.



DHCP Server

Server Mode: Server

Starting IP Address: 192.168.1.1

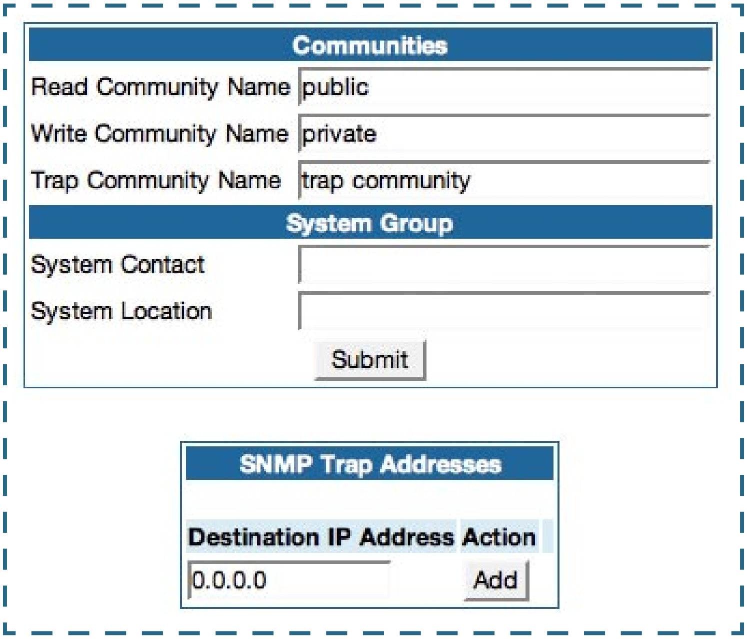
Ending IP Address: 192.168.1.254

Lease Period (d:h:m:s): 00:01:00:00

Link: SNMP

The Simple Network Management Protocol (SNMP) lets a network administrator monitor problems on a network by retrieving settings on remote network devices. The network administrator typically runs an SNMP management station program on a local host to obtain information from an SNMP agent. In this case, the Cayman Gateway is an SNMP agent.

You enter SNMP configuration information on this page.



Communities	
Read Community Name	public
Write Community Name	private
Trap Community Name	trap community
System Group	
System Contact	
System Location	

SNMP Trap Addresses	
Destination IP Address	Action
0.0.0.0	Add

Your network administrator furnishes the SNMP parameters.

WARNING:

SNMP presents you with a security issue. The community facility of SNMP behaves somewhat like a password. The community "*public*" is a well-known community name. It could be used to examine the configuration of your Gateway by your service provider or an uninvited reviewer. While Cayman's SNMP implementation does not allow changes to the configuration, the information can be read from the Gateway.

If you are strongly concerned about security, you may delete the "public" community.

Link: Advanced -> Ethernet Bridge

The Cayman Gateway can be used as a bridge, rather than a router. A bridge is a device that joins two networks. As an Internet access device, a bridge connects the home computer directly to the service provider's network equipment with no intervening routing functionality, such as Network Address Translation. Your home computer becomes just another address on the service provider's network. In a DSL connection, the bridge serves simply to convey the digital data information back and forth over your telephone lines in a form that keeps it separate from your voice telephone signals.

If your service provider's network is set up to provide your Internet connectivity via bridge mode, you can set your Cayman Gateway to be compatible.

Bridges let you join two networks, so that they appear to be part of the same physical network. As a bridge for protocols other than TCP/IP, your Gateway keeps track of as many as 255 MAC (Media Access Control) addresses, each of which uniquely identifies an individual host on a network. Your Gateway uses this bridging table to identify which hosts are accessible through which of its network interfaces. The bridging table contains the MAC address of each packet it sees, along with the interface over which it received the packet. Over time, the Gateway learns which hosts are available through its WAN port and/or its LAN port.

When configured in Bridge Mode, the Cayman will act as a pass-through device and allow the workstations on your LAN to have public addresses directly on the internet.

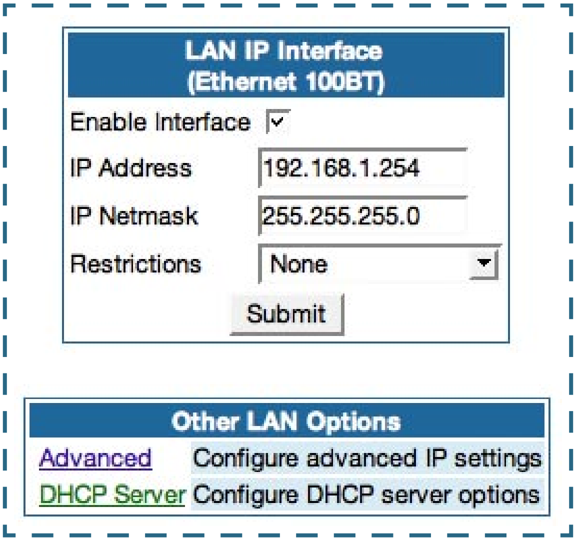
NOTE:

In this mode the Cayman is providing NO firewall protection as is afforded by NAT. Also, only the workstations that have a public address can access the internet. This can be useful when you need to use all five of your static public IP's on the LAN.

Configuring for Bridge Mode

1. **Browse into the Cayman Gateway's web interface.**
2. **Click on the *Configure* button in the upper Menu bar.**
3. **Click on the *LAN* link.**

   The LAN page appears.



LAN IP Interface (Ethernet 100BT)

Enable Interface ☑

IP Address 192.168.1.254

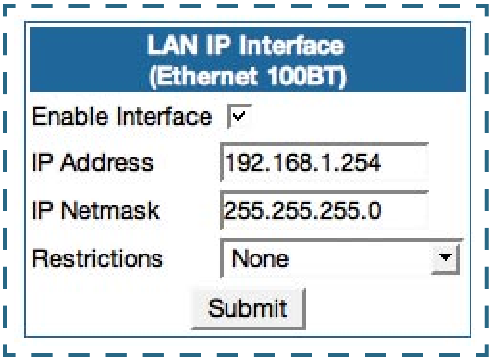
IP Netmask 255.255.255.0

Restrictions None

Other LAN Options

Advanced	Configure advanced IP settings
DHCP Server	Configure DHCP server options

4. **In the box titled LAN IP Interface (Ethernet 100BT):**



LAN IP Interface (Ethernet 100BT)

Enable Interface ☑

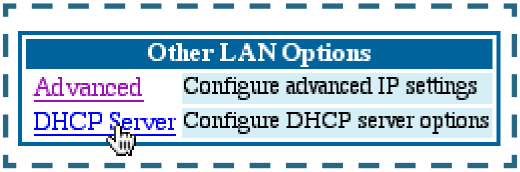
IP Address 192.168.1.254

IP Netmask 255.255.255.0

Restrictions None

a. Check the **Enable Interface** selection.
*Make note of the Ethernet IP Address and subnet mask.
You can use this address to access the router in the future. b. Click ***Submit***.

5. **Click on *DHCP Server* in the box titled Other LAN Options:**

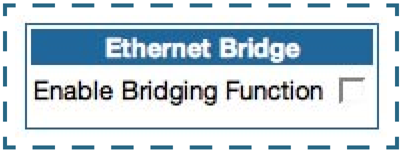


Other LAN Options	
Advanced	Configure advanced IP settings
DHCP Server	Configure DHCP server options

a. Set Server Mode to **Off**.
b. Click ***Submit***.

6. **Click on the *Advanced* link in the left-hand links toolbar.**
7. **Under the heading of Services, click on the *Ethernet Bridge* link.**

The Ethernet Bridge page appears.

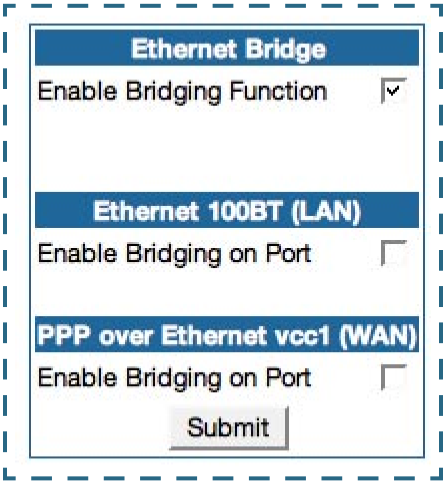


Ethernet Bridge

Enable Bridging Function □

8. **Check the *Enable Bridging Function* selection.**

The window expands.



Ethernet Bridge

Enable Bridging Function ☑

Ethernet 100BT (LAN)

Enable Bridging on Port □

PPP over Ethernet vcc1 (WAN)

Enable Bridging on Port □

9. **Under Ethernet 100BT (LAN):**

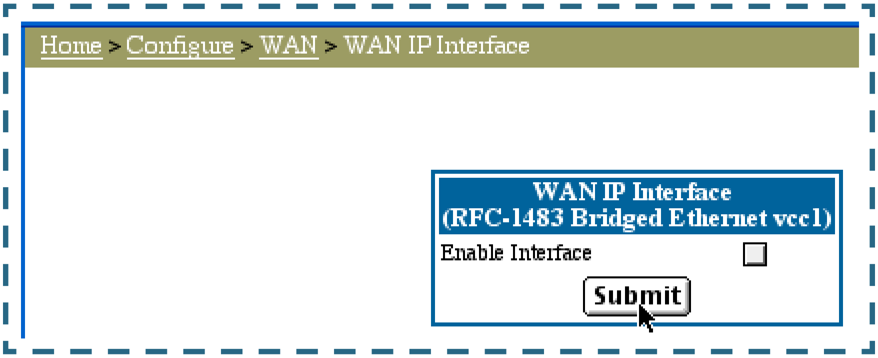
   Check the **Enable Bridging on Port** selection.

10. **Under RFC-1483 Bridged Ethernet vcc1 (WAN), or under PPP over Ethernet vcc1 (WAN) [as per your configuration]:**

    a. Check the **Enable Bridging on Port** selection.

    b. Click ***Submit***.

11. **Click on the *Configure* link in the Breadcrumb Trail directly above the selection box.**



Home > Configure > WAN > WAN IP Interface

WAN IP Interface (RFC-1483 Bridged Ethernet vcc1)

Enable Interface □

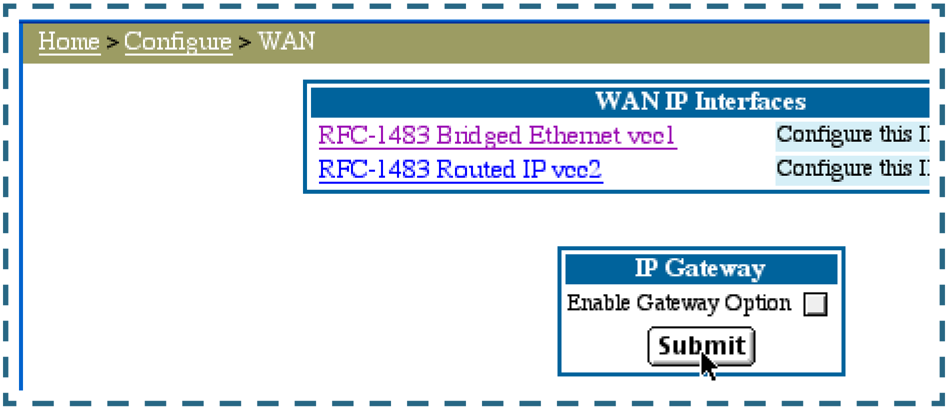
12. **Click on the WAN link that takes you to the WAN IP Interfaces box.**

13. **Click on *RFC-1483 Bridged Ethernet vcc1*, or on *PPP over Ethernet vcc1* [as per your configuration]:**

    a. Uncheck the **Enable Interface** selection.

    b. Click ***Submit***.

14. **Click on the *WAN* link in the Breadcrumb Trail directly above the selection box.**



Home > Configure > WAN

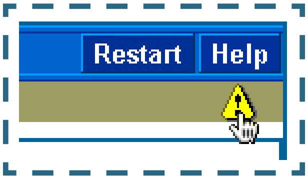
WAN IP Interfaces

RFC-1483 Bridged Ethernet vcc1	Configure this I
RFC-1483 Routed IP vcc2	Configure this I

IP Gateway

Enable Gateway Option □

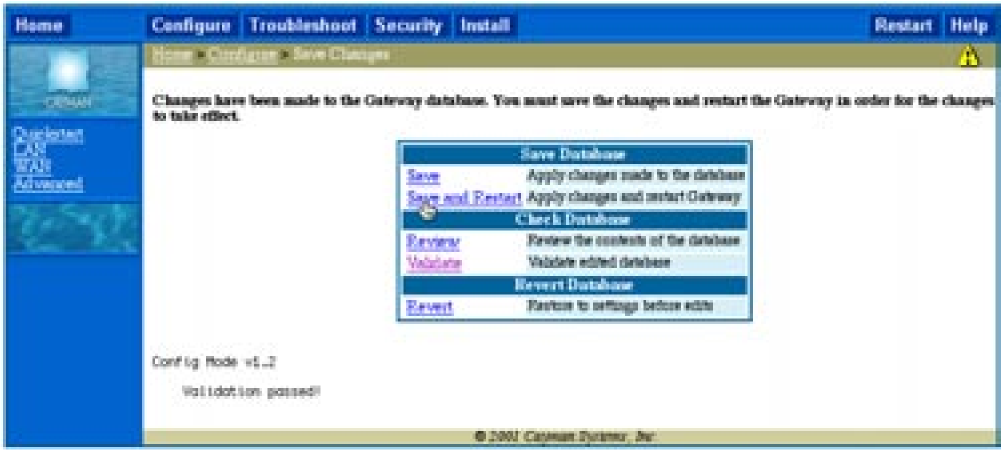
15. **In the box labeled IP Gateway:**
    a. Uncheck the **Enable Gateway Option** selection.
    b. Click ***Submit***.
16. **Click on the *Configure* link in the Breadcrumb Trail directly above the selection box.**
17. **At this point you should be ready to do the final save on the configuration changes you have made.**



The yellow **Alert** symbol will show up underneath the Help button on the right-hand end on the menu bar.

18. **Click on this symbol and you will see whether your changes have been verified.**

19. **If you are satisfied with the changes you have made, click *Save and Restart* in the Save Database box to Apply changes and restart Gateway.**



Changes have been made to the Gateway database. You must save the changes and restart the Gateway in order for the changes to take effect.

Save Database	
Save	Apply changes made to the database
Save and Restart	Apply changes and restart Gateway
Check Database	
Review	Review the contents of the database
Validate	Validate edited database
Revert Database	
Revert	Restore to settings before edits

```
Config Mode v1.2

    Validation passed!
```

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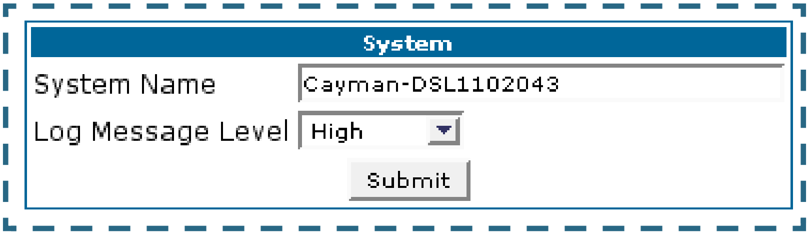
You have now configured your Cayman Gateway for bridging, and it will bridge all traffic across the WAN. You will need to make configurations to your machines on your LAN. These settings must be made in accordance with your ISP. If you ever need to get back into the Cayman Gateway again for management reasons, you will need to manually configure your machine to be in the same subnet as the Ethernet interface of the Cayman.

Link: System

The **System Name** defaults to your Gateway's factory identifier combined with its serial number. Some cable-oriented Service Providers use the System Name as an important identification and support parameter. If your Gateway is part of this type of network, do NOT alter the System Name unless specifically instructed by your Service Provider.



System

System Name: Cayman-DSL1102043

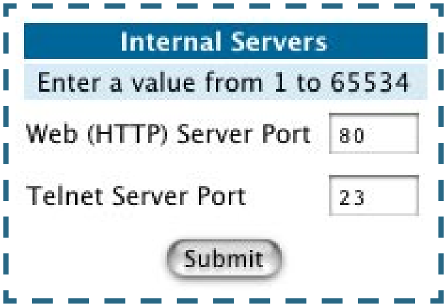
Log Message Level: High

The System Name can be 1-63 characters long; it can include embedded spaces and special characters.

The **Log Message Level** alters the severity at which messages are collected in the Gateway's system log. Do not alter this field unless instructed by your Support representative.

Link: Internal Servers

Your Gateway ships with an embedded Web server and support for a Telnet session, to allow ease of use for configuration and maintenance. The default ports of **80** for HTTP and **23** for Telnet may be reassigned. This is necessary if a pinhole is created to support applications using port 80 or 23. See See “Pinholes” on page 67. for more information on Pinhole configuration.



Internal Servers

Enter a value from 1 to 65534

Web (HTTP) Server Port: 80

Telnet Server Port: 23

Web (HTTP) Server Port: To reassign the port number used to access the Cayman embedded Web server, change this value to a value greater than 1024. When you next access the embedded Cayman Web server, append the IP address with <port number>, (e.g. Point your browser to **http://210.219.41.20:8080**).

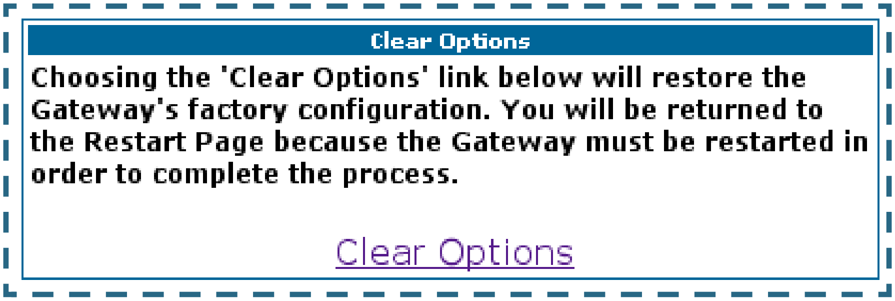
Telnet Server Port: To reassign the port number used to access your Cayman embedded Telnet server, change this value to a value greater than 1024. When you next access the Cayman embedded Telnet server, append the IP address with <port number>, (e.g. **telnet 210.219.41.20 2323**).

Link: Clear Options

To restore the factory configuration of the Gateway, choose **Clear Options**. You may want to upload your configuration to a file before performing this function.

Clear Options does not affect the software image or BootPROM.

You must restart the Gateway for **Clear Options** to take effect.



Clear Options

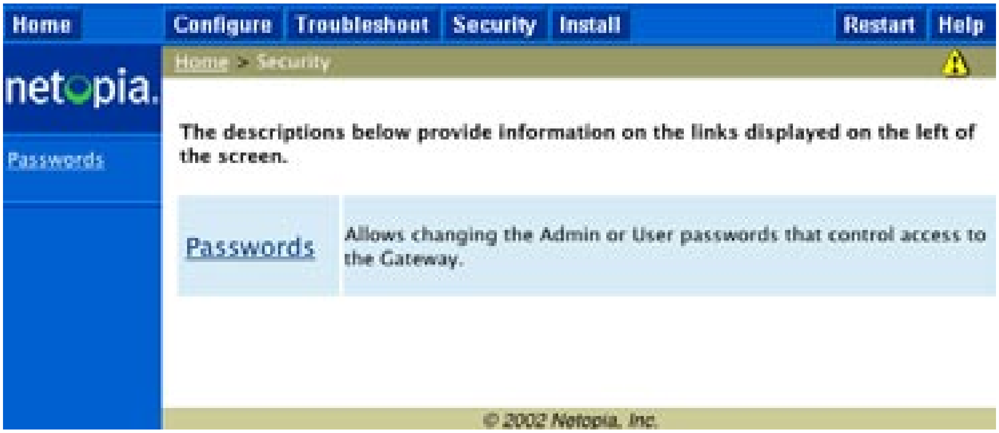
Choosing the 'Clear Options' link below will restore the Gateway's factory configuration. You will be returned to the Restart Page because the Gateway must be restarted in order to complete the process.

Clear Options

Security

Button: Security

The Security features are available by clicking on the Security toolbar button. Some items of this category do not appear when you log on as ***User***.



The descriptions below provide information on the links displayed on the left of the screen.

Passwords	Allows changing the Admin or User passwords that control access to the Gateway.

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Link: Passwords

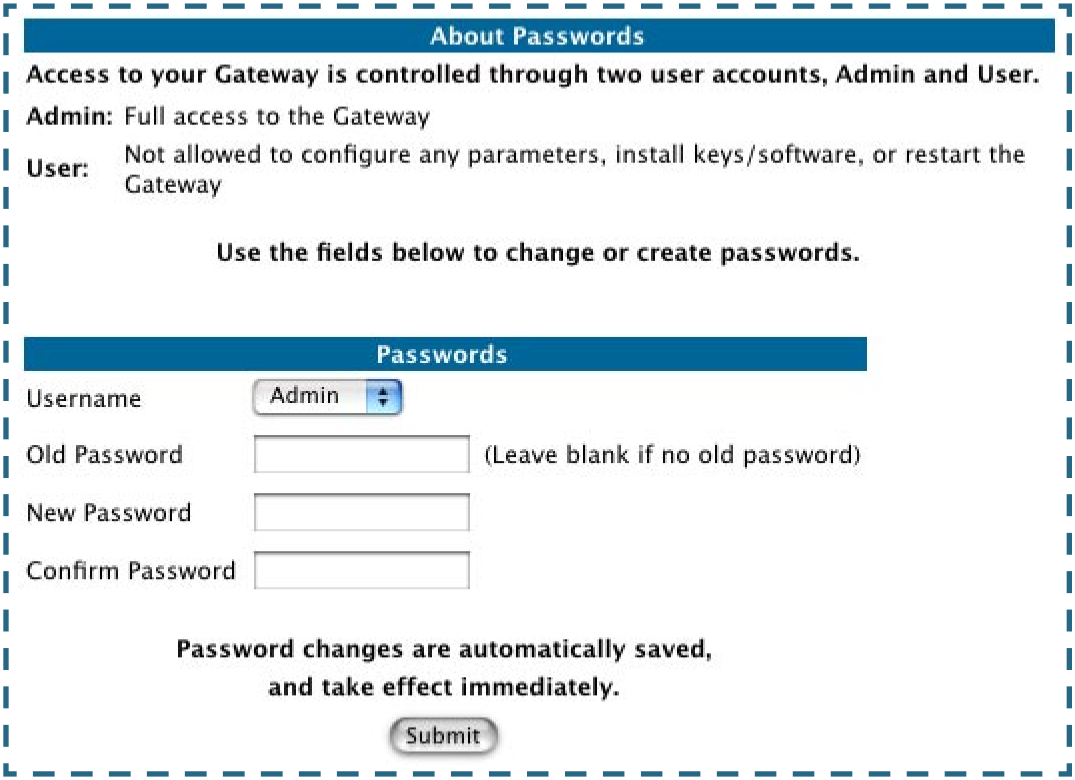
Access to your Gateway may be controlled through two optional user accounts, **Admin** and **User**. When you first power up your Gateway, you create a password for the **Admin** account. The User account does not exist by default. As the Admin, a password for the User account can be entered or existing passwords changed.

Create and Change Passwords. You can establish different levels of access security to protect your Cayman Gateway settings from unauthorized display or modification.

- Admin level privileges let you display and modify all settings in the Cayman Gateway (Read/Write mode). The Admin level password is created when you first access your Gateway.
- User level privileges let you display (but not change) settings of the Cayman Gateway. (Read Only mode)

To prevent anyone from observing the password you enter, characters in the old and new password fields are not displayed as you type them.

To display the Passwords window, click the ***Security*** toolbar button on the Home page.



About Passwords

Access to your Gateway is controlled through two user accounts, Admin and User.

Admin:	Full access to the Gateway
User:	Not allowed to configure any parameters, install keys/software, or restart the Gateway

Use the fields below to change or create passwords.

Passwords

Username	Admin	
Old Password		(Leave blank if no old password)
New Password		
Confirm Password		

Password changes are automatically saved, and take effect immediately.

Use the following procedure to change existing passwords or add the User password for your Cayman Gateway:

1. **Select the password type from the *Password Level* pull-down list.**

   Choose from ***Admin*** or ***User***.

2. **If you assigned a password to the Cayman Gateway previously, enter your current password in the *Old Password* field.**

3. **Enter your new password in the *New Password* field.**

   Cayman’s rules for a Password are:

- It can have up to eight alphanumeric characters.
- It is case-sensitive.

4. **Enter your new password again in the *Confirm Password* field.**

   You confirm the new password to verify that you entered it correctly the first time.

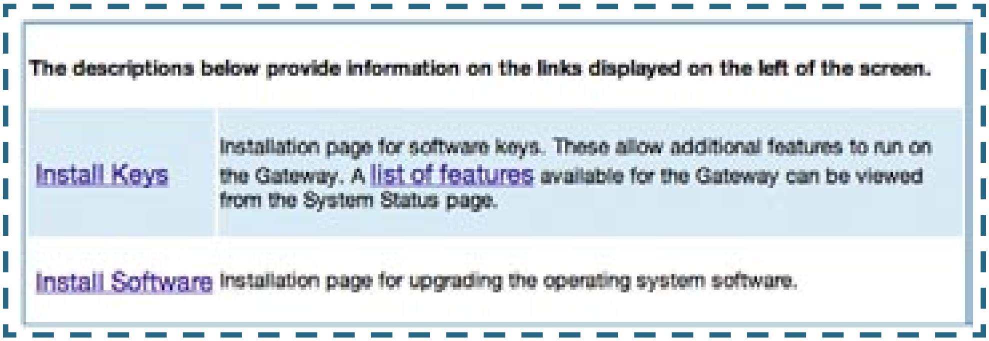
5. **When you are finished, click the *Submit* button to store your modified configuration in the Cayman unit’s memory.**

Password changes are automatically saved, and take effect immediately.

Install

Button: Install

From the **Install** toolbar button you can Install new Operating System Software as updates become available.

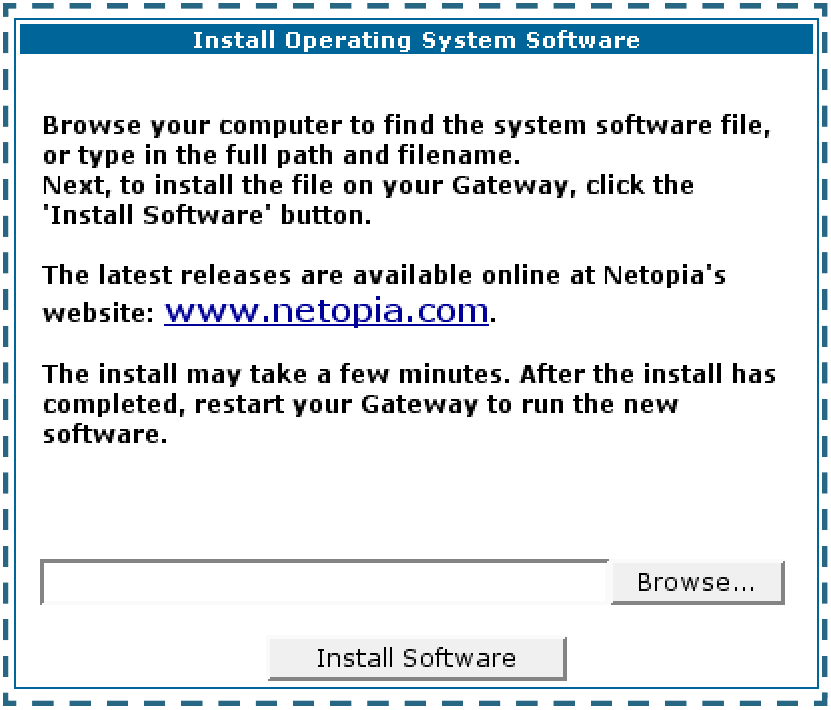


The descriptions below provide information on the links displayed on the left of the screen.

Install Keys	Installation page for software keys. These allow additional features to run on the Gateway. A list of features available for the Gateway can be viewed from the System Status page.
Install Software	Installation page for upgrading the operating system software.

Link: Install Software

This page allows you to install an updated release of the Cayman Operating System (CaymanOS).



Install Operating System Software

Browse your computer to find the system software file, or type in the full path and filename.
Next, to install the file on your Gateway, click the 'Install Software' button.

The latest releases are available online at Netopia's website: www.netopia.com.

The install may take a few minutes. After the install has completed, restart your Gateway to run the new software.

Updating Your Gateway's CaymanOS Version. You install a new operating system image in your unit from the Install Operating System Software page. For this process, the computer you are using to connect to the Cayman Gateway must be on the same local area network as the Cayman Gateway.

Required Tasks

- "Task 1: Required Files" on page 97
- "Task 2: CaymanOS Image File" on page 97

Task 1: Required Files

Upgrading the CaymanOS requires a Cayman Operating System image file.

Background

When you downloaded your operating system upgrade from the Netopia website you downloaded a ZIP file containing these files:

- *Software Upgrade Instructions* PDF file
- Cayman Operating System image for your Gateway

Confirm CaymanOS Image Files

The CaymanOS Image file is specific to the model and the product identification (PID) number.

1. **Confirm that you have received the appropriate CaymanOS Image file.**
2. **Save the CaymanOS image file to a convenient location on your PC.**

Task 2: CaymanOS Image File

Install the CaymanOS Image

To install the CaymanOS software in your Cayman Gateway from the *Home Page* use the following steps:

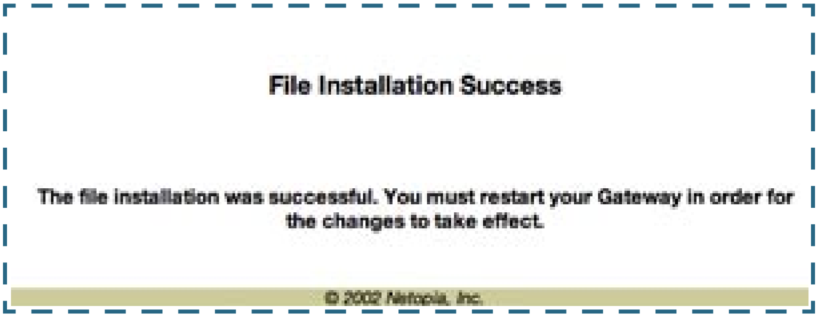
1. **Open a web connection to your Cayman Gateway from the computer on your LAN.**
2. **Click the *Install Software* button on the Cayman Gateway *Home* page.**
   The *Install New Cayman Software* window opens.
3. **Enter the filename into the text box by using one of these techniques:**
   The CaymanOS file name starts with the letter “c” (for “CaymanOS”).
   a. Click the Browse button, select the file you want, and click Open.
   -or-

b. Enter the name and path of the software image you want to install in the text field and click *Open*.

4. **Click the *Install Software* button.**

   The Cayman Gateway copies the image file from your computer and installs it into its memory storage. You see a series of dots appear on your screen as the image is copied and installed.

   When the image has been installed, a success message displays.



File Installation Success

The file installation was successful. You must restart your Gateway in order for the changes to take effect.

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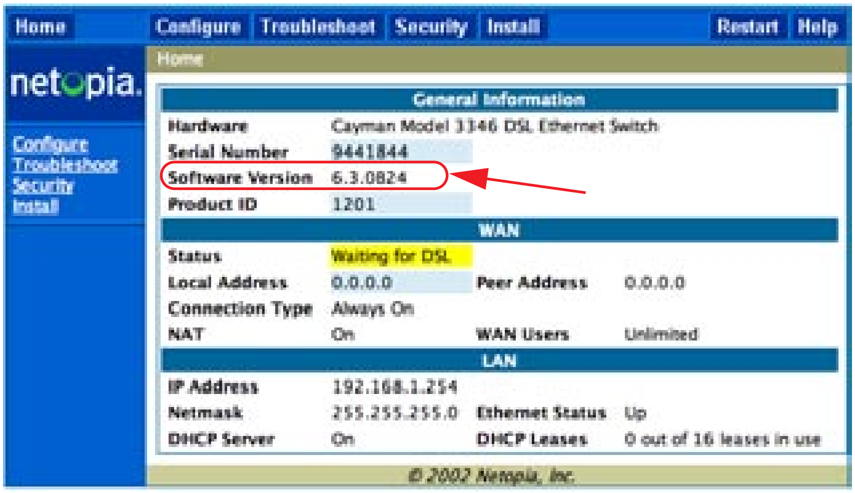
5. **When the success message appears, click the Restart button and confirm the Restart when you are prompted.**

   Your Cayman Gateway restarts with its new image.

Verify the CaymanOS Release

To verify that the CaymanOS image has loaded successfully, use the following steps:

1. **Open a web connection to your Cayman Gateway from the computer on your LAN and return to the Home page.**
2. **Verify your CaymanOS Software Release, as shown on the Home Page.**



General Information			
Hardware	Cayman Model 3346 DSL Ethernet Switch		
Serial Number	9441844		
Software Version	6.3.0824		
Product ID	1201		

WAN			
Status	Waiting for DSL		
Local Address	0.0.0.0	Peer Address	0.0.0.0
Connection Type	Always On		
NAT	On	WAN Users	Unlimited

LAN			
IP Address	192.168.1.254		
Netmask	255.255.255.0	Ethernet Status	Up
DHCP Server	On	DHCP Leases	0 out of 16 leases in use

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This completes the upgrade process.

Link: Install Keys

You can obtain advanced product functionality by employing a software **Feature Key**. Software feature keys are specific to a Gateway's serial number. Once the feature key file is installed and the Gateway is restarted, the new feature's functionality becomes enabled.

Background

Cayman Gateway users obtain advanced product functionality by installing a *software feature key*. This concept utilizes a specially constructed and distributed file (referred to as a feature key) to enable additional capability within the unit.

Software feature key properties are:

- Specific to a unit's serial number

  They will not be accepted on a platform with another serial number.

  Once installed, and the Gateway restarted, the new feature's functionality becomes available. This allows full access to configuration, operation, maintenance and administration of the new enhancement.

Software feature keys for the Cayman Operating System enable these enhancements:

- BreakWater Basic Firewall
- SafeHarbour IPSec Tunnel at the Gateway

Obtaining Software Feature Keys

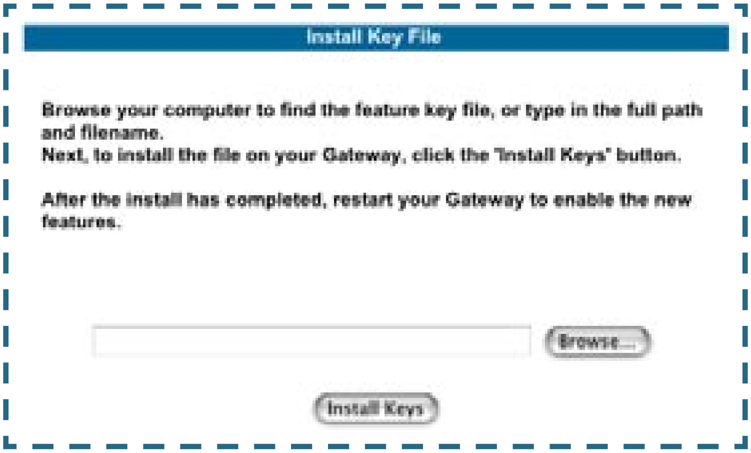
Contact your Service Provider to acquire a Software Feature Key.

Procedure - Install a New Feature Key File

With the appropriate feature key file resident on your LAN PC, use the steps listed below to enable a new function.

1. **From the Home page, click the *Install* toolbar button.**
2. **Click *Install Keys***

   The Install Key File page appears.

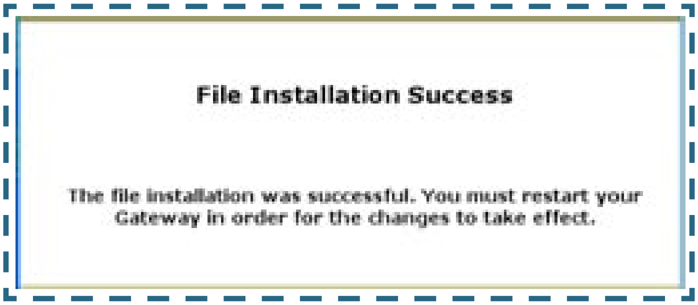


Install Key File

Browse your computer to find the feature key file, or type in the full path and filename.
Next, to install the file on your Gateway, click the "Install Keys" button.

After the install has completed, restart your Gateway to enable the new features.

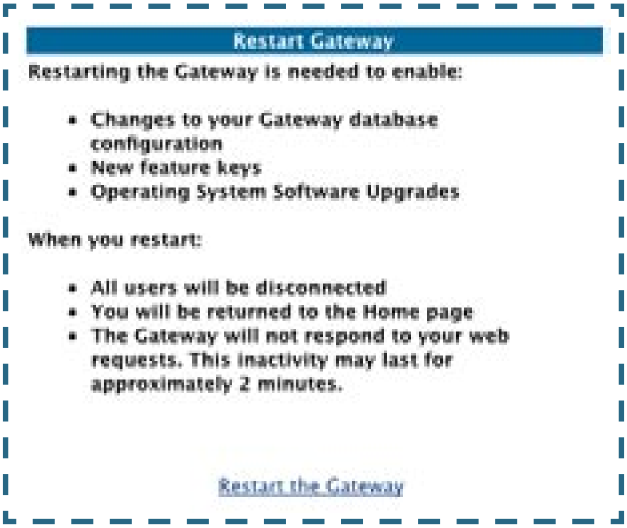
3. **Enter the feature key file name in the input Text Box.**
   Browse your drive for the file, or
   Type the full path and file name in the Text Box.
4. **Click the *Install Keys* button.**



File Installation Success

The file installation was successful. You must restart your Gateway in order for the changes to take effect.

5. **Click the *Restart* toolbar button.**
   The Confirmation screen appears.



Restart Gateway

Restarting the Gateway is needed to enable:

- Changes to your Gateway database configuration
- New feature keys
- Operating System Software Upgrades

When you restart:

- All users will be disconnected
- You will be returned to the Home page
- The Gateway will not respond to your web requests. This inactivity may last for approximately 2 minutes.

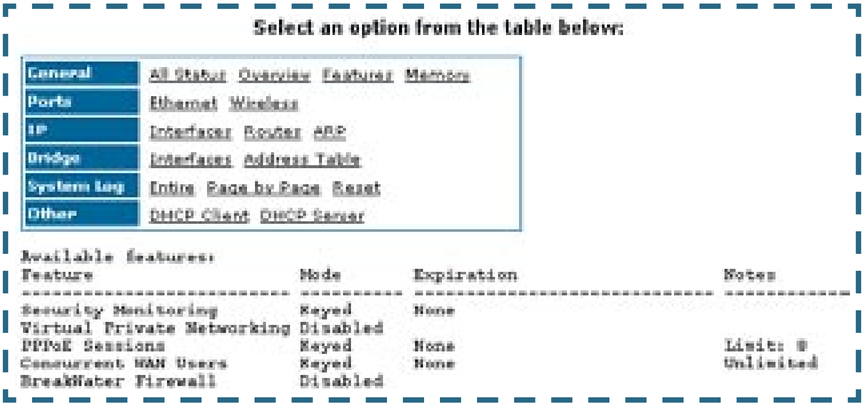
Restart the Gateway

6. **Click the *Restart the Gateway* link to confirm.**

To check your installed features:

1. **Click the *Install* toolbar button.**
2. **Click the *List of Features* link.**

   The System Status page appears with the information from the features link displayed below. You can check that the feature you just installed is enabled.



Select an option from the table below:

General	All Status Overview Features Memory
Ports	Ethernet Wireless
IP	Interfaces Router ARP
Bridge	Interfaces Address Table
System Log	Entire Page by Page Reset
Other	DHCP Client DHCP Server

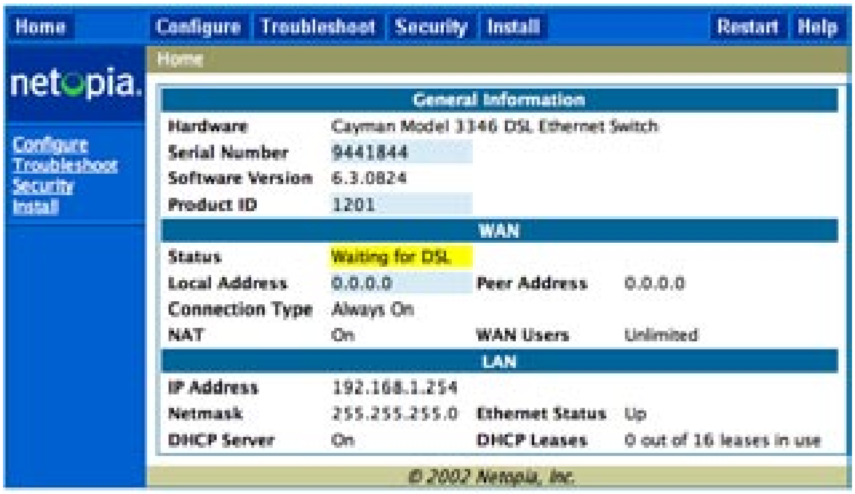
```
Available features:
Feature                    Mode       Expiration                       Notes
-------------------------- ---------- -------------------------------- ------------
Security Monitoring        Keyed      None
Virtual Private Networking Disabled
PPPoE Sessions             Keyed      None                             Limit: 8
Concurrent WAN Users       Keyed      None                             Unlimited
BreakWater Firewall        Disabled
```

CHAPTER 5 Advanced Troubleshooting

Advanced Troubleshooting can be accessed from the Gateway’s Web UI. Point your browser to ***http://cayman***. The main page displays the device status. (If this does not make the Web UI appear, then do a release and renew in Windows networking to see what the Gateway address really is.)

Home Page

The home page displays basic information about the Gateway. This includes the ISP Username, Connection Status, Device Address, Device Address Gateway, DNS-1, and DNS-2. If you are not able to connect to the Internet, verify the following:



General Information			
Hardware	Cayman Model 3346 DSL Ethernet Switch		
Serial Number	9441844		
Software Version	6.3.0824		
Product ID	1201		
WAN			
Status	Waiting for DSL		
Local Address	0.0.0.0	Peer Address	0.0.0.0
Connection Type	Always On		
NAT	On	WAN Users	Unlimited
LAN			
IP Address	192.168.1.254		
Netmask	255.255.255.0	Ethernet Status	Up
DHCP Server	On	DHCP Leases	0 out of 16 leases in use

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Item	Description
Local WAN IP Address	This is the negotiated address of the Gateway's WAN interface. This address is usually dynamically assigned.
Remote Gateway Address	This is the negotiated address of the remote router to which this Gateway is connected.

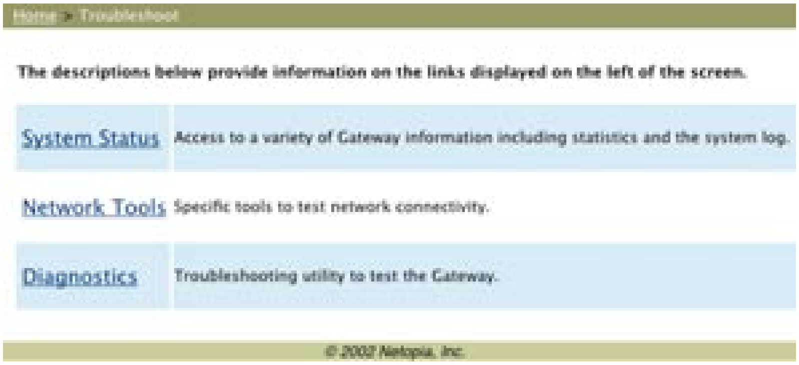
Item	Description
Status of Connection	'Waiting for DSL' is displayed while the Gateway is training. This should change to 'Up' within two minutes. If not, make sure an RJ-11 cable is used, the Gateway is connected to the correct wall jack, and the Gateway is not plugged into a micro filter. 'No Connection' is displayed if the Gateway has trained but failed the PPPoE login. This usually means an invalid user name or password. Go to Configure and change the PPPoE name and password. 'Up' is displayed when the ADSL line is synched and the PPPoE session is established.
ISP Username	This should be the valid PPPoE username. If not, go to Configure and change to the correct username.
Device Address	This is the negotiated address of the Gateway's WAN interface. This address is often dynamically assigned. Make sure this is a valid address. If this is not the correct assigned address, go to Configure and verify the PPPoE address has not been manually assigned.
Device Gateway	This is the negotiated address of the remote router. Make sure this is a valid address. If this is not the correct address, go to Configure and verify the address has not been manually assigned.
Primary DNS Secondary DNS	These are the negotiated DNS addresses. Make sure they are valid DNS addresses. If these are not the correct addresses, go to Configure and verify the addresses have not been manually assigned.
Serial Number	This is the unique serial number of your Gateway.
Ethernet Status	This is the status of your Ethernet connection. It should be **Up**.

Item	Description
Software Release	This is the version number of the current embedded software in your Gateway.
Warranty Date	This is the date that your Gateway was installed and enabled.

Button: Troubleshoot

Cayman Gateways have advanced troubleshooting tools that are used to pinpoint the exact source of a problem.

Clicking the Troubleshoot tab displays a page with links to System Status, Network Tools, and Diagnostics.



Home > Troubleshoot

The descriptions below provide information on the links displayed on the left of the screen.

System Status	Access to a variety of Gateway information including statistics and the system log.
Network Tools	Specific tools to test network connectivity.
Diagnostics	Troubleshooting utility to test the Gateway.

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- System Status: Displays an overall view of the system and its condition.
- Network Tools: Includes Ping, TraceRoute, and NSLookup.
- Diagnostics: Runs a multi-layer diagnostic test that checks the LAN, WAN, PPPoE, and other connection issues.

System Status

In the system status screen, there are several utilities that are useful for troubleshooting. Some examples are given below.

Link: Ports: Ethernet

The Ethernet port selection shows the traffic sent and received on the Ethernet interface. There should be frames and bytes on both the upstream and downstream sides. If there are not, this could indicate a bad Ethernet cable or no Ethernet connection. Below is an example:

```
                    Ethernet Driver Statistics - Device Number 0

      Ethernet Receiver ( Upstream )

      Total good frames            0
      Total bytes received         0
      Total errors                 0
      Total UCast frames           0
      Total MCast frames           0
      Total discard frames         0

      Ethernet Transmitter ( Downstream )

      Total bytes sent           612
      Total errors                 0
      Total UCast frames          14
      Total MCast frames           0
      Total discard frames         0
```

Link: Ports: DSL

The DSL port selection shows the state of the DSL line, whether it is up or down and how many times the Gateway attempted to train. The state should indicate ‘up’ for a working configuration. If it is not, check the DSL cable and make sure it is plugged in correctly and not connected to a micro filter. Below is an example:

```
ADSL Line State:        Up
ADSL Startup Attempts:  5
                        Downstream  Upstream
                        ----------  ----------
SNR Margin:                   18.6        14.0 dB
Line Attenuation:              0.4         4.0 dB
Errored Seconds:                14           3
Loss of Signal:                  4           4
Loss of Frame:                   0           0
CRC Errors:                      0           0
Data Rate:                    8000         800
```

Link: DSL: Circuit Configuration

The DSL Circuit Configuration screen shows the traffic sent and received over the DSL line as well as the trained rate (upstream and downstream) and the VPI/VCI. Verify traffic is being sent over the DSL line. If not, check the cabling and make sure the Gateway is not connected to a micro filter. Also verify the correct PVC is listed, which should be 8/35 (some providers use other values, such as 0/35. Check with your provider). If not go to the WAN setup and change the VPI/VCI to its correct value. Below is an example:

```
ATM port status    : Up
Rx data rate (bps) : 8000
Tx data rate (bps) : 800
ATM Virtual Circuits:

VCC #  Type  VPI   VCI   Encapsulation
----  ----  ---  -----  --------------------------
 1     PVC    8     35   PPP over Ethernet (LLC/SNAP encapsulation)

ATM Circuit Statistics:
Rx Frames     :      17092           Tx Frames     :      25078
Rx Octets     :     905876           Tx Octets     :    1329134
Rx Errors     :          0           Tx Errors     :          0
Rx Discards   :          0           Tx Discards   :          0
No Rx Buffers :          0           Tx Queue Full :          0
```

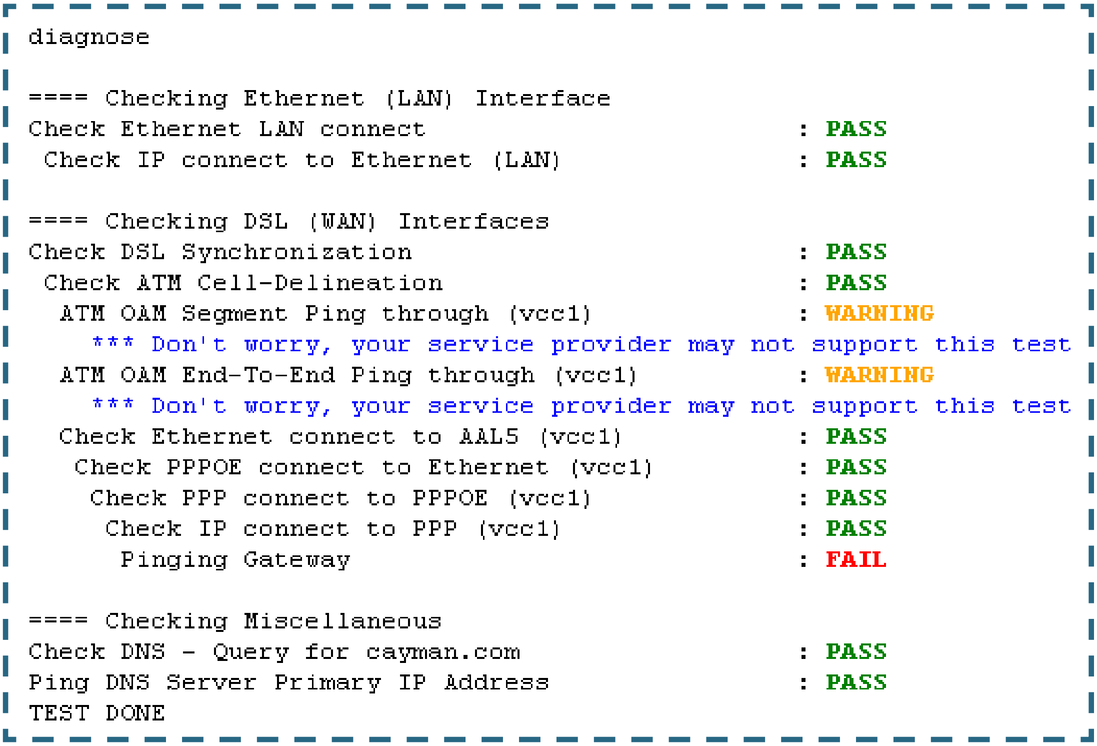
Link: System Log: Entire

The system log shows the state of the WAN connection as well as the PPPoE session. Verify that the PPPoE session has been correctly established and there are no failures. If there are error messages, go to the WAN configuration and verify the settings. The following is an example of a successful connection:

```
3/30/2002 19:22:58> ADSL detected
3/30/2002 19:23:4> ATM Connected
3/30/2002 19:23:4> ATM layer is up, cell delineation achieved
3/30/2002 19:23:4> ADSL connected
3/30/2002 19:23:8> PPP1 PPPoE Session is established.
3/30/2002 19:23:8> PPP PAP Authentication success
3/30/2002 19:23:8> PPP1: PPP IP address is 163.176.224.71
3/30/2002 19:23:8> PPP1: PPP Gateway IP address is 163.176.224.254
3/30/2002 19:23:8> PPP1: DNS Primary IP address is 163.176.4.10
3/30/2002 19:23:8> PPP1: DNS Secondary IP address is 163.176.4.32
3/30/2002 19:23:8> NAT/NAPT Session Start: VC# 0, WAN IP is 163.176.224.71
3/30/2002 19:23:8> NAPT: sesPVC0 session is up.
3/30/2002 19:23:9> PPP1 Session is up.
```

Diagnostics

The diagnostics section tests a number of different things at the same time, including the DSL line, the Ethernet interface and the PPPoE session.



```
diagnose

==== Checking Ethernet (LAN) Interface
Check Ethernet LAN connect                        : PASS
 Check IP connect to Ethernet (LAN)               : PASS

==== Checking DSL (WAN) Interfaces
Check DSL Synchronization                         : PASS
 Check ATM Cell-Delineation                       : PASS
  ATM OAM Segment Ping through (vcc1)             : WARNING
    *** Don't worry, your service provider may not support this test
  ATM OAM End-To-End Ping through (vcc1)          : WARNING
    *** Don't worry, your service provider may not support this test
  Check Ethernet connect to AAL5 (vcc1)           : PASS
   Check PPPOE connect to Ethernet (vcc1)         : PASS
    Check PPP connect to PPPOE (vcc1)             : PASS
     Check IP connect to PPP (vcc1)               : PASS
      Pinging Gateway                             : FAIL

==== Checking Miscellaneous
Check DNS - Query for cayman.com                  : PASS
Ping DNS Server Primary IP Address                : PASS
TEST DONE
```

Possible results are as follows:

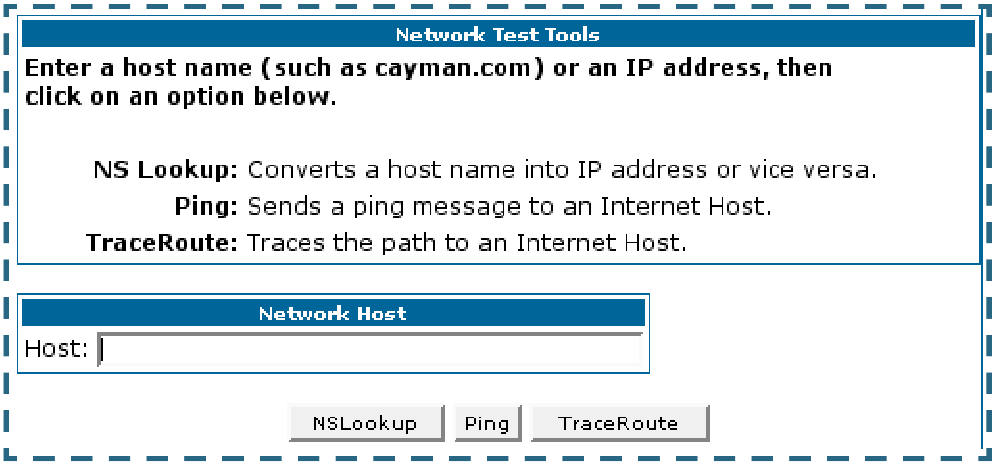
CODE	Description
PASS	The test was successful.
FAIL	The test was unsuccessful.

CODE	Description
SKIPPED	The test was skipped because a test on which it depended failed, or it was not supported by the service provider equipment to which it is connected.
PENDING	The test timed out without producing a result. Try running the test again.
WARNING	The test was unsuccessful. The Service Provider equipment your Gateway connects to may not support this test.

Network Tools

Three test tools are available from this page.

- **NSLookup** - converts a domain name to its IP address and vice versa.
- **Ping** - tests the "reachability" of a particular network destination by sending an ICMP echo request and waiting for a reply.
- **TraceRoute** - displays the path to a destination by showing the number of hops and the router addresses of these hops.



Network Test Tools

Enter a host name (such as cayman.com) or an IP address, then click on an option below.

NS Lookup: Converts a host name into IP address or vice versa.

Ping: Sends a ping message to an Internet Host.

TraceRoute: Traces the path to an Internet Host.

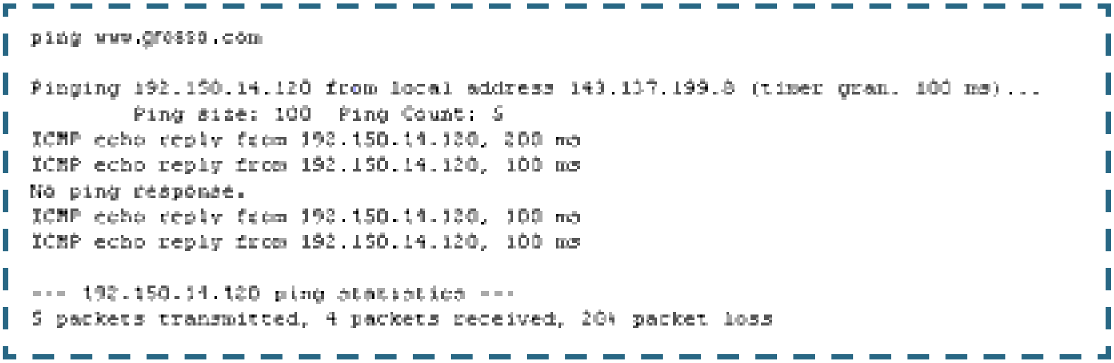
Network Host

Host:

PING: The network tools section sends a PING from the Gateway to either the LAN or WAN to verify connectivity. A PING could be either an IP address (163.176.4.32) or Domain Name (www.netopia.com).

- To use the Ping capability, type a destination address (domain name or IP address) in the text box and click the ***Ping*** button.

  Example: Ping to grosso.com.



```
ping www.grosso.com

Pinging 192.150.14.120 from local address 143.137.199.8 (timer gran. 100 ms)...
         Ping size: 100  Ping Count: 5
ICMP echo reply from 192.150.14.120, 200 ms
ICMP echo reply from 192.150.14.120, 100 ms
No ping response.
ICMP echo reply from 192.150.14.120, 100 ms
ICMP echo reply from 192.150.14.120, 100 ms

--- 192.150.14.120 ping statistics ---
5 packets transmitted, 4 packets received, 20% packet loss
```

Result: The host was reachable with four out of five packets sent.

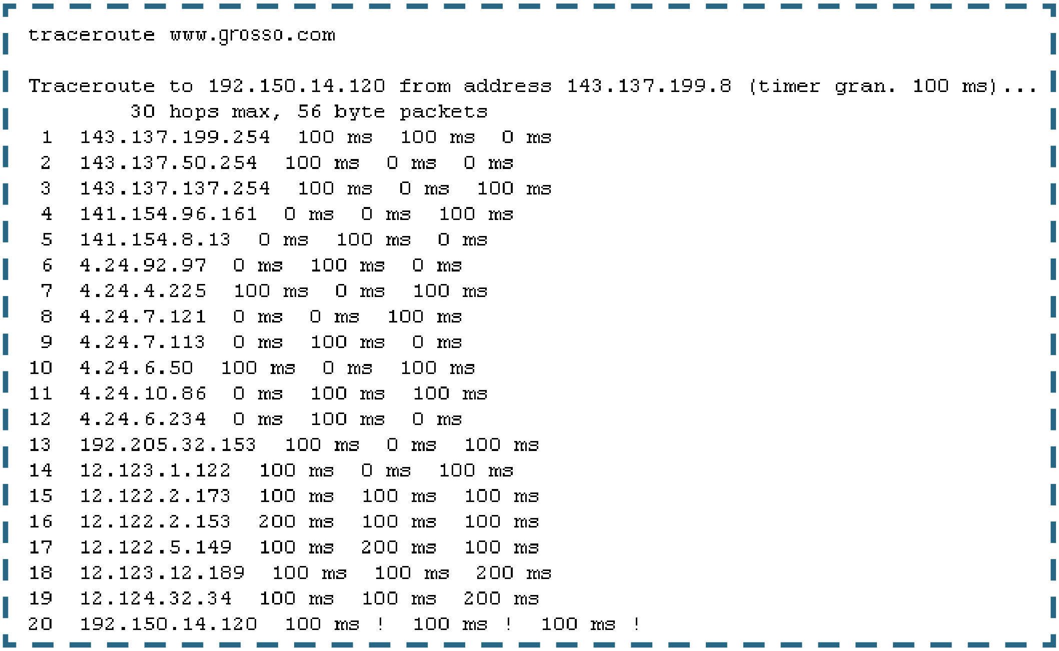
Below are some specific tests:

Action	If PING is not successful, possible causes are:
From the Gateway's Network Tools page:	
Ping the internet default gateway IP address	DSL is down, DSL or ATM settings are incorrect; Gateway’s IP address or subnet mask are wrong; gateway router is down.
Ping an internet site by IP address	Gateway’s default gateway is incorrect, Gateway’s subnet mask is incorrect, site is down.

Action	If PING is not successful, possible causes are:
Ping an internet site by name	DNS is not properly configured on the Gateway; configured DNS servers are down; site is down.
From a LAN PC:	
Ping the Gateway’s LAN IP address	IP address and subnet mask of PC are not on the same scheme as the Gateway; cabling or other connectivity issue.
Ping the Gateway’s wan IP address	Default gateway on PC is incorrect.
Ping the Gateway’s internet default gateway IP address	NAT is off on the Gateway and the internal IP addresses are private.
Ping an internet site by IP address	PC's subnet mask may be incorrect, site is down.
Ping an internet site by name	DNS is not properly configured on the PC, configured DNS servers are down, site is down.

- To use the TraceRoute capability, type a destination address (domain name or IP address) in the text box and click the ***TraceRoute*** button.

Example: Show the path to the grosso.com site.



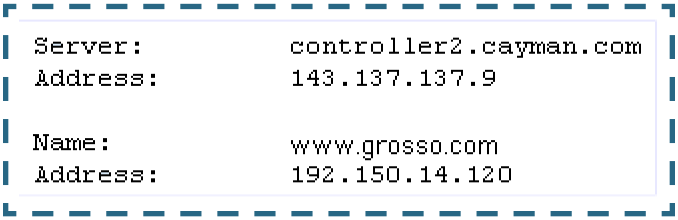
```
traceroute www.grosso.com

Traceroute to 192.150.14.120 from address 143.137.199.8 (timer gran. 100 ms)...
        30 hops max, 56 byte packets
 1  143.137.199.254  100 ms  100 ms  0 ms
 2  143.137.50.254  100 ms  0 ms  0 ms
 3  143.137.137.254  100 ms  0 ms  100 ms
 4  141.154.96.161  0 ms  0 ms  100 ms
 5  141.154.8.13  0 ms  100 ms  0 ms
 6  4.24.92.97  0 ms  100 ms  0 ms
 7  4.24.4.225  100 ms  0 ms  100 ms
 8  4.24.7.121  0 ms  0 ms  100 ms
 9  4.24.7.113  0 ms  100 ms  0 ms
10  4.24.6.50  100 ms  0 ms  100 ms
11  4.24.10.86  0 ms  100 ms  100 ms
12  4.24.6.234  0 ms  100 ms  0 ms
13  192.205.32.153  100 ms  0 ms  100 ms
14  12.123.1.122  100 ms  0 ms  100 ms
15  12.122.2.173  100 ms  100 ms  100 ms
16  12.122.2.153  200 ms  100 ms  100 ms
17  12.122.5.149  100 ms  200 ms  100 ms
18  12.123.12.189  100 ms  100 ms  200 ms
19  12.124.32.34  100 ms  100 ms  200 ms
20  192.150.14.120  100 ms !  100 ms !  100 ms !
```

Result: It took 20 hops to get to the grosso.com web site.

- To use the NSLookup capability, type an address (domain name or IP address) in the text box and click the ***NSLookup*** button.

Example: Show the IP Address for grosso.com.



```
Server:          controller2.cayman.com
Address:         143.137.137.9

Name:            www.grosso.com
Address:         192.150.14.120
```

Result: The DNS Server doing the lookup is displayed in the **Server:** and **Address:** fields. If the Name Server can find your entry in its table, it is displayed in the **Name:** and **Address:** fields.

CHAPTER 6 Command Line Interface

The Cayman Gateway operating software includes a command line interface (CLI) that lets you access your Cayman Gateway over a telnet connection. You can use the command line interface to enter and update the unit's configuration settings, monitor its performance, and restart it.

This chapter covers the following topics:

Overview

The CLI has two major command modes: **SHELL** and **CONFIG**. **Summary tables** that list the commands are provided below. Details of the entire command set follow in this section.

SHELL Commands

Command	Status and/or Description
arp	send ARP request
atmping	send ATM OAM loopback (DSL only)
clear	erase all stored configuration information
configure	set the unit’s options
diagnose	run the automatic self-test
download	download the config file
help	get more information on a command: “help all” or “help help”
install	download and program an image into flash
log	add a message to the diagnostic log
loglevel	report or change diagnostic log level
netstat	show IP information
nslookup	send DNS query for host
ping	send ICMP echo request
quit	quit this shell
reset	reset subsystems
restart	restart the Gateway
show	display specific system information
start	start subsystem
status	display basic status of Gateway
telnet	telnet to a remote host
upload	upload config file
who	show who is using the shell

CONFIG Commands

Command Verbs	Status and/or Description
set	Set configuration data
define	Define environment data
delete	Delete configuration list data
view	View configuration data
script	Print configuration data
help	Help command option
save	Save configuration data
Keywords	
system	Gateway’s system options
pppoe	PPP over Ethernet options
dmt	DMT ADSL options
atm	ATM options (DSL only)
bncp	Bridge CP options
ip	TCP/IP protocol options
dhcp	Dynamic Host Configuration Protocol options
nat-default	Network Address Translation default options
dns	Domain Name System options
bridge	Bridge options
ppp	Peer-to-Peer Protocol options
pinhole	Pinhole options
security	Security options
servers	Internal Server options
validate	Validate configuration settings
preference	Shell environment settings
Command Utilities	

top	Go to top level of configuration mode
quit	Exit from configuration mode; return to shell mode
exit	Exit from configuration mode; return to shell mode

Starting and Ending a CLI Session

Open a telnet connection from a workstation on your network.

You initiate a telnet connection by issuing the following command from an IP host that supports telnet, for example, a personal computer running a telnet application such as NCSA Telnet.

```
telnet <ip_address>
```

You must know the IP address of the Cayman Gateway before you can make a telnet connection to it. By default, your Cayman Gateway uses 192.168.1.254 as the IP address for its LAN interface. You can use a Web browser to configure the Cayman Gateway IP address.

Logging In

The command line interface log-in process emulates the log-in process for a UNIX host. To logon, enter the username (either admin or user), and your password.

- Entering the administrator password lets you display and update all Cayman Gateway settings.
- Entering a user password lets you display (but not update) Cayman Gateway settings.

When you have logged in successfully, the command line interface lists the username and the security level associated with the password you entered in the diagnostic log.

Ending a CLI Session

You end a command line interface session by typing **quit** from the SHELL node of the command line interface hierarchy.

Saving Settings

The **save** command saves the working copy of the settings to the Gateway. The Gateway automatically validates its settings when you save and displays a warning message if the configuration is not correct.

Using the CLI Help Facility

The **help** command lets you display on-line help for SHELL and CONFIG commands. To display a list of the commands available to you from your current location within the command line interface hierarchy, enter **`help`**.

To obtain help for a specific CLI command, type **`help <`*`command`*`>`**. You can truncate the ***help*** command to ***h*** or a question mark when you request help for a CLI command.

About SHELL Commands

You begin in SHELL mode when you start a CLI session. SHELL mode lets you perform the following tasks with your Cayman Gateway:

- Monitor its performance
- Display and reset Gateway statistics
- Issue administrative commands to restart Cayman Gateway functions

SHELL Prompt

When you are in SHELL mode, the CLI prompt is the name of the Cayman Gateway followed by a right angle bracket (>). For example, if you open a CLI connection to the Cayman Gateway named “Coconut,” you would see ***Coconut>*** as your CLI prompt.

SHELL Command Shortcuts

You can **truncate** most commands in the CLI to their shortest unique string. For example, you can use the truncated command ***q*** in place of the full ***quit*** command to exit the CLI. However, you would need to enter ***rese*** for the ***reset*** command, since the first characters of ***reset*** are common to the ***restart*** command.

The only command you cannot truncate is ***restart***. To prevent accidental interruption of communications, you must enter the ***restart*** command in its entirety.

You can use the Up and Down arrow keys to scroll backward and forward through recent commands you have entered. Alternatively, you can use the ***!!*** command to repeat the last command you entered.

SHELL Commands

Common Commands

arp *nnn.nnn.nnn.nnn*

Sends an Address Resolution Protocol (ARP) request to match the *`nnn.nnn.nnn.nnn`* IP address to an Ethernet hardware address.

clear [yes]

Clears the configuration settings in a Cayman Gateway. If you do not use the optional **`yes`** qualifier, you are prompted to confirm the **`clear`** command.

configure

Puts the command line interface into Configure mode, which lets you configure your Cayman Gateway with Config commands. Config commands are described starting on page 120.

diagnose

Runs a diagnostic utility to conduct a series of internal checks and loopback tests to verify network connectivity over each interface on your Cayman Gateway. The console displays the results of each test as the diagnostic utility runs. If one test is dependent on another, the diagnostic utility indents its entry in the console window. For example, the diagnostic utility indents the Check IP connect to Ethernet (LAN) entry, since that test will not run if the Check Ethernet LAN Connect test fails.

Each test generates one of the following result codes:

CODE	Description
PASS	The test was successful.
FAIL	The test was unsuccessful.
SKIPPED	The test was skipped because a test on which it depended failed.
PENDING	The test timed out without producing a result. Try running the test again.

download [-fw –key *server_address*] [*filename*] [confirm]

With no flags set, this command installs a file of configuration parameters into the Cayman Gateway from a TFTP (Trivial File Transfer Protocol) server. The TFTP server must be accessible on your Ethernet network.

With the **–fw** flag set, downloads a new firewall text configuration to the Gateway.

With the **–key** flag set, downloads a new feature key to the Gateway.

You can include one or more of the following arguments with the download command. If you omit arguments, the console prompts you for this information.

- The ***server_address*** argument identifies the IP address of the TFTP server from which you want to copy the Cayman Gateway configuration file.
- The ***filename*** argument identifies the path and name of the configuration file on the TFTP server.
- If you include the optional **confirm** keyword, the download begins as soon as all information is entered.

install [*server_address*] [*filename*] [confirm]

Downloads a new version of the Cayman Gateway operating software from a TFTP (Trivial File Transfer Protocol) server, validates the software image, and programs the image into the Cayman Gateway memory. After you install new operating software, you must restart the Cayman Gateway.

The TFTP server must be accessible on your Ethernet network. The ***server_address*** argument identifies the IP address of the TFTP server on which your Cayman Gateway operating software is stored. The ***filename*** argument identifies the path and name of the operating software file on the TFTP server.

If you include the optional **confirm** keyword, you will not be prompted to identify a TFTP server or file name. Your Cayman Gateway begins the software installation using its default boot settings.

log *message_string*

Adds the message in the ***message_string*** argument to the Cayman Gateway diagnostic log.

loglevel [*level*]

Displays or modifies the types of log messages you want the Cayman Gateway to record. If you enter the **loglevel** command without the optional ***level*** argument, the command line interface displays the current log level setting.

You can enter the **loglevel** command with the ***level*** argument to specify the types of diagnostic messages you want to record. All messages with a level number equal to or greater than the level you specify are recorded. For example, if you specify loglevel 3, the diagnostic log will retain high-level informational messages (level 3), warnings (level 4), and failure messages (level 5).

Use the following values for the *level* argument:

- **1** or **low** – Low-level informational messages or greater; includes trivial status messages.
- **2** or **medium** – Medium-level informational messages or greater; includes status messages that can help monitor network traffic.
- **3** or **high** – High-level informational messages or greater; includes status messages that may be significant but do not constitute errors.
- **4** or **warning** – Warnings or greater; includes recoverable error conditions and useful operator information.
- **5** or **failure** – Failures; includes messages describing error conditions that may not be recoverable.

netstat -i

Displays the IP interfaces for your Cayman Gateway.

netstat -r

Displays the IP routes stored in your Cayman Gateway.

nslookup { *hostname* | *ip_address* }

Performs a domain name system lookup for a specified host.

- The ***hostname*** argument is the name of the host for which you want DNS information; for example, ***nslookup klaatu***.

- The ***ip_address*** argument is the IP address, in dotted decimal notation, of the device for which you want DNS information.

ping [-s *size*] [-c *count*]{ *hostname* | *ip_address* }

Causes the Cayman Gateway to issue a series of ICMP Echo requests for the device with the specified name or IP address.

- The ***hostname*** argument is the name of the device you want to ping; for example, ***ping ftp.cayman.com***.
- The ***ip_address*** argument is the IP address, in dotted decimal notation, of the device you want to locate. If a host using the specified name or IP address is active, it returns one or more ICMP Echo replies, confirming that it is accessible from your network.
- The ***-s*** ***size*** argument lets you specify the size of the ICMP packet.
- The ***-c*** ***count*** argument lets you specify the number of ICMP packets generated for the ping request.

You can use the **ping** command to determine whether a hostname or IP address is already in use on your network. You cannot use the **ping** command to ping the Cayman Gateway’s own IP address.

quit

Exits the Cayman Gateway command line interface.

reset arp

Clears the Address Resolution Protocol (ARP) cache on your unit.

reset crash

Clears crash-dump information, which identifies the contents of the Cayman Gateway registers at the point of system malfunction.

reset dhcp server

Clears the DHCP lease table in the Cayman Gateway.

reset enet

Resets Ethernet statistics to zero

reset hosts

Clears all entries in the host name table. Thereafter, when PCs configured as DHCP clients use the Gateway, new entries will be rebuilt. DHCP serving must be enabled.

reset log

Rewinds the diagnostic log display to the top of the existing Cayman Gateway diagnostic log. The **`reset`** log command does not clear the diagnostic log. The next **`show log`** command will display information from the beginning of the log file.

reset security-log

Clears the security monitoring log to make room to capture new entries.

reset wan-users [all | *ip-address*]

This function disconnects the specified WAN User to allow for other users to access the WAN. This function is only available if the number of WAN Users is restricted and NAT is on. Use the **all** parameter to disconnect all users. If you logon as Admin you can disconnect any or all users. If you logon as User, you can only disconnect yourself.

restart [*seconds*]

Restarts your Cayman Gateway. If you include the optional ***seconds*** argument, your Cayman Gateway will restart when the specified number of seconds have elapsed. You must enter the complete **`restart`** command to initiate a restart.

show bridge interfaces

Displays bridge interfaces maintained by the Cayman Gateway.

show bridge table

Displays the bridging table maintained by the Cayman Gateway.

show crash

Displays the most recent crash information, if any, for your Cayman Gateway.

show dhcp server leases [used | free]

Displays the DHCP leases stored in RAM by your Cayman Gateway. You can include the ***used*** argument to see the list of DHCP leases that are in use or that have been used since your Cayman Gateway was restarted. You can include the ***free*** argument to see the list of DHCP leases that are available for use.

show dhcp server store

Displays the DHCP leases stored in NVRAM by your Cayman Gateway.

show ip arp

Displays the Ethernet address resolution table stored in your Cayman Gateway.

show ip igmp

Displays the contents of the IGMP Group Address table and the IGMP Report table maintained by your Cayman Gateway.

show ip interfaces

Displays the IP interfaces for your Cayman Gateway.

show ip routes

Displays the IP routes stored in your Cayman Gateway.

show log

Displays blocks of information from the Cayman Gateway diagnostic log. To see the entire log, you can repeat the **`show log`** command or you can enter **`show log all.`**

show memory [all]

Displays memory usage information for your Cayman Gateway. If you include the optional ***all*** argument, your Cayman Gateway will display a more detailed set of memory statistics.

show pppoe

Displays status information for each PPP socket, such as the socket state, service names, and host ID values.

show status

Displays the current status of a Cayman Gateway, the device's hardware and software revision levels, a summary of errors encountered, and the length of time the Cayman Gateway has been running since it was last restarted. Identical to the **status** command.

telnet { *hostname* | *ip_address* } [*port*]

Lets you open a telnet connection to the specified host through your Cayman Gateway.

- The ***hostname*** argument is the name of the device to which you want to connect; for example, ***telnet ftp.cayman.com*****.**
- The ***ip_address*** argument is the IP address, in dotted decimal notation, of the device to which you want to connect.
- The ***port*** argument is the number of t he port over which you want to open a telnet session.

upload [*server_address*] [*filename*] [confirm]

Copies the current configuration settings of the Cayman Gateway to a TFTP (Trivial File Transfer Protocol) server. The TFTP server must be accessible on your Ethernet network. The ***server_address*** argument identifies the IP address of the TFTP server on which you want to store the Cayman Gateway settings. The ***filename*** argument identifies the path and name of the configuration file on the TFTP server. If you include the optional **confirm** keyword, you will not be prompted to identify a TFTP server or file name.

who

Displays the names of the current shell users.

DSL Commands

atmping *vpi vci* [segment | end-to-end]

Lets you check the ATM connection reachability and network connectivity. This command sends five Operations, Administration, and Maintenance (OAM) loopback calls to the specified vpi/vci destination. There is a five second total timeout interval.

Use the **segment** argument to ping a neighbor switch.
Use the **end-to-end** argument to ping a remote end node

reset atm

Resets the ATM statistics to zero.

reset dsl

Resets any open DSL connection.

reset ppp *vccn*

Resets the point-to-point connection over the specified virtual circuit. This command only applies to virtual circuits that use PPP framing.

show atm [all]

Displays ATM statistics for the Cayman Gateway. The optional **`all`** argument displays a more detailed set of ATM statistics.

show dsl

Displays DSL port statistics, such as upstream and downstream connection rates and noise levels.

show ppp [{ stats | lcp | ipcp | lastconnect }] [vccn]

Displays information about open PPP links. You can display a subset of the PPP statistics by including an optional **`stats, lcp, ipcp,`** or **`lastconnect`** argument for the **`show ppp`** command. The optional **`vccn`** argument lets you specify the virtual circuit for which you want statistics.

start ppp vccn

Opens a PPP link on the specified virtual circuit.

show ppp [{ stats | lcp | ipcp | lastconnect }]

Displays information about open PPP links. You can display a subset of the PPP statistics by including an optional **`stats, lcp, ipcp,`** or **`lastconnect`** argument for the **`show ppp`** command.

start ppp

Opens a PPP link (typically PPP over Ethernet).

About CONFIG Commands

You reach the configuration mode of the command line interface by typing ***configure*** (or any truncation of ***configure***, such as ***c*** or ***config***) at the CLI SHELL prompt.

CONFIG Mode Prompt

When you are in CONFIG mode, the CLI prompt consists of the name of the Cayman Gateway followed by your current **node** in the hierarchy and two right angle brackets (>>). For example, when you enter CONFIG mode (by typing ***config*** at the SHELL prompt), the `Coconut (top)`**`>>`** prompt reminds you that you are at the top of the CONFIG hierarchy. If you move to the **`ip`** node in the CONFIG hierarchy (by typing **`ip`** at the CONFIG prompt), the prompt changes to **`Coconut (ip)>>`** to identify your current location.

Some CLI commands are not available until certain conditions are met. For example, you must enable IP for an interface before you can enter IP settings for that interface.

Navigating the CONFIG Hierarchy

- **Moving from CONFIG to SHELL** — You can navigate from anywhere in the CONFIG hierarchy back to the SHELL level by entering `quit` at the CONFIG prompt and pressing RETURN.

  ```
  Dogzilla (top)>> quit
  Dogzilla >
  ```

- **Moving from *top* to a subnode** — You can navigate from the top node to a subnode by entering the node name (or the significant letters of the node name) at the CONFIG prompt and pressing RETURN. For example, you move to the IP subnode by entering **`ip`** and pressing RETURN.

```
Dogzilla (top)>> ip
Dogzilla (ip)>>
```

As a shortcut, you can enter the significant letters of the node name in place of the full node name at the CONFIG prompt. The significant characters of a node name are the letters that uniquely identify the node. For example, since no other CONFIG node starts with I, you could enter one letter ("**i**") to move to the IP node.

- **Jumping down several nodes at once** — You can jump down several levels in the CONFIG hierarchy by entering the complete path to a node.
- **Moving up one node** — You can move up through the CONFIG hierarchy one node at a time by entering the **up** command.
- **Jumping to the top node** — You can jump to the top level from anywhere in the CONFIG hierarchy by entering the **top** command.
- **Moving from one subnode to another** — You can move from one subnode to another by entering a partial path that identifies how far back to climb.
- **Moving from any subnode to any other subnode** — You can move from any subnode to any other subnode by entering a partial path that starts with a top-level CONFIG command.
- **Scrolling backward and forward through recent commands** — You can use the Up and Down arrow keys to scroll backward and forward through recent commands you have entered. When the command you want appears, press Enter to execute it.

Entering Commands in CONFIG Mode

CONFIG commands consist of keywords and arguments. Keywords in a CONFIG command specify the action you want to take or the entity on which you want to act. Arguments in a CONFIG command specify the values appropriate to your site. For example, the CONFIG command

```
set ip ethernet address ip_address
```

consists of three keywords (***ip***, ***ethernet***, and ***address***) and one argument (***ip_address***). When you use the command to configure your Gateway, you would replace the argument with a value appropriate to your site.

For example:

```
set ip ethernet address 192.31.222.57
```

Guidelines: CONFIG Commands

The following table provides guidelines for entering and formatting CONFIG commands.

Command component	Rules for entering CONFIG commands
Command verbs	CONFIG commands must start with a command verb (set, view, delete). You can truncate CONFIG verbs to three characters (set, vie, del). CONFIG verbs are case-insensitive. You can enter “SET,” “Set,” or “set.”
Keywords	Keywords are case-insensitive. You can enter “Ethernet,” “ETHERNET,” or “ethernet” as a keyword without changing its meaning. Keywords can be abbreviated to the length that they are differentiated from other keywords.
Argument Text	Text strings can be as many as 64 characters long, unless otherwise specified. Special characters are represented using backslash notation. Text strings may be enclosed in double (“) or single (‘) quote marks. If the text string includes an embedded space, it must be enclosed in quotes. Special characters are represented using backslash notation.
Numbers	Enter numbers as integers.
IP addresses	Enter IP addresses in dotted decimal notation (0 to 255).

If a command is ambiguous or miskeyed, the CLI prompts you to enter additional information. For example, you must specify which vir tual circuit you are configuring when you are setting up a Cayman Gateway.

Displaying Current Gateway Settings

You can use the ***view*** command to display the current CONFIG settings for your Cayman Gateway. If you enter the ***view*** command at the top level of the CONFIG hierarchy, the CLI displays the settings for all enabled functions. If you enter the ***view*** command at an intermediate node, you see settings for that node and its subnodes.

Step Mode: A CLI Configuration Technique

The Cayman Gateway command line interface includes a step mode to automate the process of entering configuration settings. When you use the CONFIG step mode, the command line interface prompts you for all required and optional information. You can then enter the configuration values appropriate for your site without having to enter complete CLI commands.

When you are in step mode, the command line interface prompts you to enter required and optional settings. If a setting has a default value or a current setting, the command line interface displays the default value for the command in parentheses. If a command has a limited number of acceptable values, those values are presented in brackets, with each value separated by a vertical line. For example, the following CLI step command indicates that the default value is **`off`** and that valid entries are limited to **`on`** and **`off`**.

```
option (off) [on | off]: on
```

You can accept the default value for a field by pressing the Return key. To use a different value, enter it and press Return.

You can enter the CONFIG step mode by entering ***set*** from the top node of the CONFIG hierarchy. You can enter step mode for a particular service by entering *set* ***service_name*****.** For example:

```
           Dogzilla (top)>> set system
           Stepping set mode (press Control-X
<Return/Enter> to
           exit)
           ...
           system
              name ("Dogzilla"): Mycroft
              Diagnostic Level (High): medium
           Stepping mode ended.
```

Validating Your Configuration

You can use the **validate** CONFIG command to make sure that your configuration settings have been entered correctly. If you use the **validate** command, the Cayman Gateway verifies that all required settings for all services are present and that settings are consistent.

```
           Dogzilla (top)>> validate
           Error: Subnet mask is incorrect
           Global Validation did not pass
inspection!
```

You can use the **validate** command to verify your configuration settings at any time. Your Cayman Gateway automatically validates your configuration any time you save a modified configuration.

CONFIG Commands

This section describes the keywords and arguments for the various CONFIG commands.

DSL Commands

ATM Settings. You can use the CLI to set up each ATM virtual circuit.

set atm option {on | off }

Enables the WAN interface of the Cayman Gateway to be configured using the Asynchronous Transfer Mode (ATM) protocol.

set atm [vccn] option {on | off }

Selects the virtual circuit for which further parameters are set. Up to eight VCCs are supported; the maximum number is dependent on your Cayman Operating System tier and the capabilities that your Service Provider offers.

set atm [vccn] vpi { 0 ... 255 }

Select the virtual path identifier (vpi) for VCC n.

Your Service Provider will indicate the required vpi number.

set atm [vccn] vci { 0 ... 65535 }

Select the virtual channel identifier (vci) for VCC n.

Your Service Provider will indicate the required vci number.

set atm [vccn] encap { ppp-vc | ppp-llc | ether-vcmux | ether-llc | ip-vcmux | ip-llc | ppoe-vcmux | pppoe-llc }

Select the encapsulation mode for VCC n. The options are:

ppp-vc	PPP over ATM, VC-muxed
ppp-llc	PPP over ATM, LLC-SNAP
ether-vcmux	RFC-1483, bridged Ethernet, VC-muxed
ether-llc	RFC-1483, bridged Ethernet, LLC-SNAP
ip-vcmux	RFC-1483, routed IP, VC-muxed
ip-llc	RFC-1483, routed IP, LLC-SNAP
pppoe-vcmux	PPP over Ethernet, VC-muxed
pppoe-llc	PPP over Ethernet, LLC-SNAP

Your Service Provider will indicate the required encapsulation mode.

set atm [vccn] pppoe-sessions { 1 ... 8 }

Select the number of PPPoE sessions to be configured for VCC n. Up to eight can be configured on the first VCC; one on the other VCCs. The total must be less than or equal to eight.

set atm [vccn] tx-priority [low | high]

Select the transmission priority for vcc n. The Gateway transmits traffic for high priority VCCs before it transmits traffic for low priority VCCs. Bandwidth is split between VCCs of equal priority.

set atm [vccn] tx-max-kbps [0 <no limit> | 1 -1000]

Specifies the maximum upstream (transmission) rate of the virtual circuit (measured in kilobytes per second). Zero (0) indicates no restriction on transmission rate.

DHCP Settings

As a Dynamic Host Control Protocol (DHCP) server, your Cayman Gateway can assign IP addresses and provide configuration information to other devices on your network dynamically. A device that acquires its IP address and other TCP/IP configuration settings from the Cayman Gateway can use the information for a fixed period of time (called the DHCP lease).

Common Commands

set dhcp option { off | server | relay-agent }

Enables or disables DHCP services in the Cayman Gateway. You must enable DHCP services before you can enter other DHCP settings for the Cayman Gateway.

If you turn off DHCP services and save the new configuration, the Cayman Gateway clears its DHCP settings.

set dhcp start-address *ip_address*

If you selected **`server`**, specifies the first address in the DHCP address range. The Cayman Gateway can reserve a sequence of up to 253 IP addresses within a subnet, beginning with the specified address for dynamic assignment.

set dhcp end-address *ip_address*

If you selected **`server`**, specifies the last address in the DHCP address range.

set dhcp lease-time *lease-time*

If you selected **`server,`** specifies the default length for DHCP leases issued by the Cayman Gateway. Enter lease time in **`dd:hh:mm:ss`** (day/hour/minute/second) format.

DMT Settings

DSL Commands

set dmt type [lite | dmt | ansi | multi]

Selects the type of Discrete Multitone (DMT) asynchronous digital subscriber line (ADSL) protocol to use for the WAN interface.

Domain Name System Settings

Domain Name System (DNS) is an information service for TCP/IP networks that uses a hierarchical naming system to identify network domains and the hosts associated with them. You can identify a primary DNS server and one secondary server.

Common Commands

set dns domain-name *domain-name*

Specifies the default domain name for your network. When an application needs to resolve a host name, it appends the default domain name to the host name and asks the DNS server if it has an address for the “fully qualified host name.”

set dns primary-address *ip_address*

Specifies the IP address of the primary DNS name server.

set dns secondary-address *ip_address*

Specifies the IP address of the secondary DNS name server. Enter ***0.0.0.0*** if your network does not have a secondary DNS name server.

IP Settings

You can use the command line interface to specify whether TCP/IP is enabled, identify a default Gateway, and to enter TCP/IP settings for the Cayman Gateway LAN and WAN ports. If PPPoE is turned off, you must specify settings for Ethernet A and B separately. If PPPoE is turned on, you can omit the A|B labels.

Common Settings

set ip option { on | off }

Enables or disables TCP/IP services in the Cayman Gateway. You must enable TCP/IP services before you can enter other TCP/IP settings for the Cayman Gateway. If you turn off TCP/IP services and save the new configuration, the Cayman Gateway clears its TCP/IP settings.

set ip ipsec-passthrough (on) {on | off}

IPSec PassThrough supports VPN clients running on LAN-connected computers. Turn this setting off if your LAN-side VPN client includes its own NAT interoperability solution.

DSL Settings

set ip dsl vccn address *ip_address*

Assigns an IP address to the virtual circuit. Enter 0.0.0.0 if you want the virtual circuit to obtain its IP address from a remote DHCP server.

set ip dsl vccn broadcast *broadcast_address*

Specifies the broadcast address for the TCP/IP network connected to the virtual circuit. IP hosts use the broadcast address to send messages to every host on your network simultaneously.

The broadcast address for most networks is the network number followed by 255. For example, the broadcast address for the 192.168.1.0 network would be 192.168.1.255.

set ip dsl vccn netmask *netmask*

Specifies the subnet mask for the TCP/IP network connected to the virtual circuit. The subnet mask specifies which bits of the 32-bit binary IP address represents network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask).

set ip dsl *vccn* restriction { admin-disabled | admin-only| none }

Specifies restrictions on the types of traffic the Cayman Gateway accepts over the DSL virtual circuit. The **`admin-disable`** argument means that router traffic is accepted but that administrative commands are ignored. The **`admin-only`** argument means that router traffic is ignored by that administrative commands are accepted. The **none** argument means that all traffic is accepted. RIP and ICMP traffic is still accepted.

set ip dsl vccn addr-mapping { on | off }

Specifies whether you want the Cayman Gateway to use network address translation (NAT) when communicating with remote routers. Address mapping lets you conceal details of your network from remote routers. It also permits all LAN devices to share a single IP address.

By default, address mapping is turned “On”.

set ip dsl vccn proxy-arp { on | off }

Specifies whether you want the Gateway to respond when it receives an address resolution protocol for devices behind it.

By default, proxy ARP is turned “Off”.

Ethernet Hub Settings

set ip ethernet option { on | off }

Enables or disables communications through the designated Ethernet port in the Gateway. You must enable TCP/IP functions for and Ethernet port before you can configure it network settings

set ip ethernet address *ip_address*

Assigns an IP address to the Cayman Gateway on the local area network. The IP address you assign to the local Ethernet interface must be unique on your network. By default, the Cayman Gateway uses 192.168.1.254 as its LAN IP address.

set ip ethernet broadcast *broadcast_address*

Specifies the broadcast address for the local Ethernet interface. IP hosts use the broadcast address to send messages to every host on your network simultaneously.

The broadcast address for most networks is the network number followed by 255. For example, the broadcast address for the 192.168.1.0 network would be 192.168.1.255.

set ip ethernet netmask *netmask*

Specifies the subnet mask for the local Ethernet interface. The subnet mask specifies which bits of the 32-bit binary IP address represent network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask).

set ip ethernet A restrictions { none | admin-disabled }

Specifies whether an administrator can open a telnet connection to a DSL Cayman Gateway over the Ethernet interface to monitor and configure the unit.

set ip ethernet restrictions { none | admin-disabled }
set ip ethernet restrictions { none | admin-disabled | admin-only }

Specifies whether an administrator can open a telnet connection to a Cayman Gateway over the Ethernet interface to monitor and configure the unit. On the WAN port, you can enable or disable administrator access or specify that the WAN port can only be used for administrative traffic. By default, administrative restrictions are turned off, meaning an administrator can open a telnet connection.

set ip ethernet proxy-arp { on | off }

Specifies whether you want the Cayman Gateway to respond when it receives an address resolution protocol for devices behind it. By default, proxy ARP is turned off.

set ip ethernet rip-send { off | v1 | v2 | v1-compat | v2-MD5 }

Specifies whether the Cayman Gateway should use Routing Information Protocol (RIP) broadcasts to advertise its routing tables to other routers on your network. RIP Version 2 (RIP-2) is an extension of the original Routing Information Protocol (RIP-1) that expands the amount of useful information in the RIP packets. While RIP-1 and RIP-2 share the same basic algorithms, RIP-2 supports several new features, including inclusion of subnet masks in RIP packets and implementation of multicasting instead of broadcasting (which reduces the load on hosts which do not support routing protocols. RIP-2 with MD5 authentication is an extension of RIP-2 that increases security by requiring an authentication key when routes are advertised.

Depending on your network needs, you can configure your Cayman Gateway to support RIP-1, RIP-2, or both.

set ip ethernet rip-receive { off | v1 | v2 | v1-compat | v2-MD5 }

Specifies whether the Cayman Gateway should use Routing Information Protocol (RIP) broadcasts to update its routing tables with information received from other routers on your network.

Default IP Gateway Settings

set ip gateway option { on | off }

Specifies whether the Cayman Gateway should send packets to a default Gateway if it does not know how to reach the destination host.

set ip gateway interface { ip-address | ppp }

Specifies how the Cayman Gateway should route information to the default Gateway. If you select **`ip-address`**, you must enter the IP address of a host on a local or remote network. If you specify **`ppp`**, the Cayman unit uses the default gateway being used by the remote PPP peer.

set ip gateway interface { ip-address | ppp-vccn}

Specifies whether a DSL Gateway is reached using a fixed IP address or through a PPP virtual circuit.

set ip gateway default *ip_address*

Specifies the IP address of the default IP Gateway.

WAN-to-WAN Routing Settings. Use the following command to configure settings for routing between WAN connections.

set ip interwan-routing { on | off }

Enables or disables routing between WAN connections.

IP-over-PPP Settings. Use the following commands to configure settings for routing IP over a virtual PPP interface.

NOTE:

For the DSL platform you must identify the virtual PPP interface [**vccn**], a number from 1 to 8.

set ip ip-ppp [*vccn*] option { on | off }

Enables or disables IP routing through the virtual PPP interface. By default, IP routing is turned off. You must enable IP routing before you can enter other IP routing settings for the virtual PPP interface. If you turn off IP routing and save the new configuration, the Cayman Gateway clears IP routing settings

set ip ip-ppp [*vccn*] address *ip_address*

Assigns an IP address to the virtual PPP interface. If you specify an IP address other than 0.0.0.0, your Cayman Gateway will not negotiate its IP address with the remote peer. If the remote peer does not accept the IP address specified in the ***ip_address*** argument as valid, the link will not come up.

The default value for the ***ip_address*** argument is 0.0.0.0, which indicates that the virtual PPP interface will use the IP address assigned to it by the remote peer. Note that the remote peer must be configured to supply an IP address to your Cayman Gateway if you enter 0.0.0.0 for the ***ip_address*** argument.

set ip ip-ppp [*vccn*] peer-address *ip_address*

Specifies the IP address of the peer on the other end of the PPP link. If you specify an IP address other than 0.0.0.0, your Cayman Gateway will not negotiate the remote peer's IP address. If the remote peer does not accept the address in the ***ip_address*** argument as its IP address (typically because it has been configured with another IP address), the link will not come up.

The default value for the ***ip_address*** argument is 0.0.0.0, which indicates that the virtual PPP interface will accept the IP address returned by the remote peer. If you enter 0.0.0.0, the peer system must be configured to supply this address.

set ip ip-ppp [*vccn*] restriction
{ admin-disabled | admin-only | none }

Specifies restrictions on the types of traffic the Cayman Gateway accepts over the PPP virtual circuit. The ***admin-only*** argument means that router traffic is ignored but that administrative commands are accepted. The ***none*** argument means that all traffic is accepted.

set ip ip-ppp [*vccn*] addr-mapping { on | off }

Specifies whether you want the Cayman Gateway to use network address translation (NAT) when communicating with remote routers. Network address translation lets you conceal details of your network from remote routers. By default, address mapping is turned on.

set ip ip-ppp [*vccn*] vj-compression { on | off }

Specifies whether you want to negotiate Van Jacobson header compression for asynchronous PPP links. By default, TCP/IP header compression is turned on.

When Van Jacobson header compression is turned on, your Cayman Gateway allocates memory for 16 slots (headers) by default. The number of slots may be reduced during link configuration if the remote peer can only support a lower number.

set ip ip-ppp [*vccn*] ipcp-subnet { on | off }

Specifies whether you want your Cayman Gateway to negotiate allocation of an IP subnet, rather than a single IP address, from a remote access server. You should only enable this feature if you are told to do so by your Internet Service Provider.

set ip ip-ppp [*vccn*] rip-send {off | v1 | v2 | v1-compat}

Specifies whether the Cayman Gateway unit should use Routing Information Protocol (RIP) broadcasts to advertise its routing tables to routers on the other side of the PPP link. An extension of the original Routing Information Protocol (RIP-1), RIP Version 2 (RIP-2) expands the amount of useful information in the packets. While RIP-1 and RIP-2 share the same basic algorithms, RIP-2 supports several new features. For example, inclusion of subnet masks in RIP packets and implementation of multicasting instead of broadcasting. This last feature reduces the load on hosts which do not support routing protocols.

This command is only available when address mapping for the specified virtual circuit is turned “off”.

set ip ip-ppp [*vccn*] rip-receive {off | v1 | v2 | v1-compat}

Specifies whether the Cayman Gateway should use Routing Information Protocol (RIP) broadcasts to update its routing tables with information received from other routers on the other side of the PPP link.

This command is only available when address mapping for the specified virtual circuit is turned “off”.

set ip ip-ppp [*vccn*] flush-routes { on | off }

Specifies whether the Cayman Gateway should flush (delete) entries from its routing table when the specified virtual circuit is down and those routes are inaccessible.

This command is only available when address mapping for the specified virtual circuit is turned “**off**”.

Static ARP Settings. Your Cayman Gateway maintains a dynamic Address Resolution Protocol (ARP) table to map IP addresses to Ethernet (MAC) addresses. Your Cayman Gateway populates this ARP table dynamically, by retrieving IP address/ MAC address pairs only when it needs them. Optionally, you can define static ARP entries to map IP addresses to their corresponding Ethernet MAC addresses. Unlike dynamic ARP table entries, static ARP table entries do not time out.

You can configure as many as 16 static ARP table entries for a Cayman Gateway. Use the following commands to add static ARP entries to the Cayman Gateway static ARP table:

set ip static-arp ip-address *ip_address*

Specifies the IP address for the static ARP entry. Enter an IP address in the ***ip_address*** argument in dotted decimal format. The ***ip_address*** argument cannot be 0.0.0.0.

set ip static-arp hardware-address *MAC_address*

Specifies the Ethernet hardware address for the static ARP entry. Enter an Ethernet hardware address in the ***MAC_address*** argument in ***nn.nn.nn.nn.nn.nn*** (hexadecimal) format.

WAN Settings.

NOTE:

For the DSL platform you must identify the virtual PPP interface [**vccn**], a number from 1 to 8.

set ip wan [vccn] option { on | off }

Enables or disables communications through the specified VCC Interface in the Cayman Gateway. You must enable TCP/IP [or BNCP] functions for the WAN port before you can configure its network settings.

set ip wan [vccn] address *ip_address*

Assigns an IP address to the Cayman Gateway on the specified VCC interface. The IP address you assign must be unique on your network.

set ip wan [vccn] broadcast *broadcast_address*

Specifies the broadcast address for the TCP/IP network connected to the specified VCC interface. IP hosts use the broadcast address to send messages to every host on your network simultaneously.

The broadcast address for most networks is the network number followed by 255. For example, the broadcast address for the 192.168.1.0 network would be 192.168.1.255.

set ip wan [vccn] netmask *netmask*

Specifies the subnet mask for the TCP/IP network connected to the specified VCC interface. The subnet mask specifies which bits of the 32-bit binary IP address represent network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask).

set ip wan [vccn] restrictions { admin-disabled | admin-only | none }

Specifies whether an administrator can open a telnet connection to the Cayman Gateway over the specified VCC interface to monitor and configure the Cayman Gateway. The ***admin-only*** argument means that router traffic is ignored but that administrative commands are accepted. The ***none*** argument means that all traffic is accepted.

WARNING:

If you specify **admin-only** access for the Cayman Gateway WAN port, you will turn off routing services through that port or interface.
Do **NOT** turn on **admin-only** access without consulting with your network administrator.

set ip wan [vccn] addr-mapping { off | on }

Specifies whether network address translation (NAT) is enabled for the specified VCC interface on the Cayman Gateway.

set ip wan [vccn] proxy-arp { on | off }

Specifies whether you want the Cayman Gateway to respond when it receives an address resolution protocol for devices behind it.
By default, proxy ARP is turned “**off**”.

Network Address Translation (NAT) Default Settings

NAT default settings let you specify whether you want your Cayman Gateway to forward NAT traffic to a default server when it doesn’t know what else to do with it. The NAT default host function is useful in situations where you cannot create a specific NAT pinhole for a traffic stream because you cannot anticipate what port number an application might use. For example, some network games select arbitrary port numbers when a connection is being opened. By identifying your computer (or another host on your network) as a NAT default server, you can specify that NAT traffic that would otherwise be discarded by the Cayman Gateway should be directed to a specific hosts.

set nat-default option { off | on }

Specifies whether you want your Cayman Gateway to forward NAT traffic to a default server when it doesn’t know what else to do with it.

set nat-default address *ip-address*

Specifies the IP address of the NAT default server.

Network Address Translation (NAT) Pinhole Settings

NAT pinholes let you pass specific types of network traffic through the NAT interfaces on the Cayman Gateway. NAT pinholes allow you to route selected types of network traffic, such as FTP requests or HTTP (Web) connections, to a specific host behind the Cayman Gateway transparently.

To set up NAT pinholes, you identify the type(s) of traffic you want to redirect by port number, and you specify the internal host to which each specified type of traffic should be directed.

The following list identifies protocol type and port number for common TCP/IP protocols:

- FTP (TCP 21)
- telnet (TCP 23)
- SMTP (TCP 25),
- TFTP (UDP 69)
- SNMP (TCP 161, UDP 161)

set pinhole name *name*

Specifies the identifier for the entry in the router's pinhole table. You can name pinhole table entries sequentially (1, 2, 3), by port number (21, 80, 23), by protocol, or by some other naming scheme.

set pinhole protocol-select
{ tcp | udp | icmp | pptp | other }

Specifies the type of protocol being redirected.

set pinhole numerical-protocol [0 - 65535]

If you select `other`, specifies the number of the protocol you want to translate.

set pinhole external-port-start [0 - 65535]

Specifies the first port number in the range being translated.

set pinhole external-port-end [0 - 65535]

Specifies the last port number in the range being translated.

set pinhole internal-ip *internal-ip*

Specifies the IP address of the internal host to which traffic of the specified type should be transferred.

set pinhole internal-port *internal-port*

Specifies the port number your Cayman Gateway should use when forwarding traffic of the specified type. Under most circumstances, you would use the same number for the external and internal port.

PPPoE Settings

You can use the following commands to configure basic settings, port authentication settings, and peer authentication settings for PPP interfaces on your Cayman Gateway.

Ethernet WAN Settings

set pppoe { on | off }

Enables or disables PPP over Ethernet on your Gateway. You must enable PPPoE before you can enter other PPP settings.

Configuring Basic PPP Settings.

NOTE:

For the DSL platform you must identify the virtual PPP interface [**vccn**], a number from 1 to 8.

set PPP module [vccn] option { on | off }

Enables or disables PPP on the Cayman Gateway.

set PPP module [vccn] mru *integer*

Specifies the Maximum Receive Unit (MRU) for the PPP interface. The ***integer*** argument can be any number between 128 and 2048.

set PPP module [vccn] magic-number { on | off }

Enables or disables LCP magic number negotiation.

set PPP module [vccn] protocol-compression { on | off }

Specifies whether you want the Cayman Gateway to compress the PPP Protocol field when it transmits datagrams over the PPP link.

set PPP module [vccn] lcp-echo-requests { on | off }

Specifies whether you want your Cayman Gateway to send LCP echo requests. You should turn off LCP echoing if you do not want the Cayman Gateway to drop a PPP link to a nonresponsive peer.

set PPP module [vccn] failures-max *integer*

Specifies the maximum number of Configure-NAK messages the PPP module can send without having sent a Configure-ACK message. The integer argument can be any number between 1 and 20.

set PPP module [vccn] configure-max *integer*

Specifies the maximum number of unacknowledged configuration requests that your Cayman Gateway will send. The integer argument can be any number between 1 and 10.

set PPP module [vccn] terminate-max *integer*

Specifies the maximum number of unacknowledged termination requests that your Cayman Gateway will send before terminating the PPP link. The integer argument can be any number between 1 and 10.

set PPP module [vccn] restart-timer *integer*

Specifies the number of seconds the Cayman Gateway should wait before retransmitting a configuration or termination request. The integer argument can be any number between 1 and 30.

set PPP module [vccn] connection-type { instant-on | always-on }

Specifies whether a PPP connection is maintained by the Cayman Gateway when it is unused for extended periods. If you specify **`always-on`**, the Cayman Gateway never shuts down the PPP link. If you specify **`instant-on`**, the Cayman Gateway shuts down the PPP link after the number of seconds specified in the **`time-out`** setting (below) if no traffic is moving over the circuit.

set PPP module [vccn] time-out *integer*

If you specified a connection type of `instant-on`, specifies the number of seconds, in the range 30-600, the Cayman Gateway should wait for communication activity before terminating the PPP link.

Configuring Port Authentication. You can use the following commands to specify how your Cayman Gateway should respond when it receives an authentication request from a remote peer.

The settings for port authentication on the local Cayman Gateway must match the authentication that is expected by the remote peer. For example, if the remote peer requires CHAP authentication and has a name and CHAP secret for the Cayman Gateway, you must enable CHAP and specify the same name and secret on the Cayman Gateway before the link can be established.

set PPP module [vccn] port-authentication
chap-option { on | off }

Specifies whether CHAP authentication is enabled. CHAP authentication must be enabled before you can enter other CHAP information. If CHAP is turned on, it will be the first authentication method offered to the remote peer during link negotiation.
If you turn port authentication off and peer authentication on, the PPP software still uses the port authentication chap-name and pap-name for authentication. As a result, the port authentication names for PAP and CHAP must be identical to the peer names for your Cayman Gateway on the remote peer. If you do not configure a chap-name or pap-name, then the authentication packets sent by the local peer will have blank name values. This may cause authentication to fail for some PPP implementations.

set PPP module [vccn] port-authentication

chap-name *chap_name*

Specifies the name the Cayman Gateway sends in a CHAP response packet. The ***chap_name*** argument is 1-64 alphanumeric characters. The information you enter must match the CHAP username configured in the remote PPP peer's authentication database.

set PPP module [vccn] port-authentication chap-secret *secret*

Specifies the CHAP secret for CHAP authentication. The secret argument is 1-64 alphanumeric characters. The information you enter must match the CHAP secret used by the PPP peer.

set PPP module [vccn] port-authentication pap-option { on | off }

Specifies whether PAP authentication is enabled for a port. By default, PAP authentication is turned off. PAP authentication must be enabled before you can enter other PAP information. If you disable PAP authentication and save the modified configuration, your Cayman Gateway retains its PAP settings.

set PPP module [vccn] port-authentication pap-name *pap_name*

Specifies the name the Cayman Gateway sends in a PAP response packet. The pap_name argument is 1- 64 alphanumeric characters. The information you enter must match the PAP username configured in the PPP peer's authentication database.

set PPP module port-authentication

pap-password *password*

Specifies the password the Cayman Gateway sends when a PPP peer sends a PAP authentication request. The password argument is 1-64 alphanumeric characters. The information you enter must match the PAP password used by the PPP peer.

Configuring Peer Authentication. You can specify that your Cayman Gateway will use PAP, CHAP, or both to authenticate a remote peer as a PPP link is being completed. Perform the following steps to specify how your Cayman Gateway should authenticate remote peers.

set PPP module [vccn] peer-authentication chap-option { on | off }

Specifies whether the Cayman Gateway will use CHAP to authenticate connections to PPP peers.

set PPP module [vccn] peer-authentication pap-option { on | off }

Specifies whether the Cayman Gateway will use PAP to authenticate connections to PPP peers.

set PPP peer-database *peer-name hostname*

Specifies the hostname for an authorized PPP peer. The hostname argument is 1-64 alphanumeric characters. The information you enter must match the username that will be returned by the PPP peer when it is being authenticated.

set PPP peer-database *peer-name* hostname

chap-secret *secret*

Specifies the secret associated with a PPP peer. The secret argument is 1-64 alphanumeric characters. The information you enter must match the secret that will be returned by the PPP peer when it is being authenticated.

set PPP peer-database peer-name hostname
pap-password *password*

Specifies the password associated with a PPP peer. The password argument is 1-64 alphanumeric characters. The password you enter for that peer must match the password that will be returned by the PPP peer when it is being authenticated.

Command Line Interface Preference Settings

You can set command line interface preferences to customize your environment.

set preference verbose { on | off }
set define verbose { on | off }

Specifies whether you want command help and prompting information displayed. By default, the command line interface verbose preference is turned off. If you turn it on, the command line interface displays help for a node when you navigate to that node.

set preference more *lines*
set define more *lines*

Specifies how many lines of information you want the command line interface to display at one time. The lines argument specifies the number of lines you want to see at one time. By default, the command line interface shows you 16 lines of text before displaying the prompt: **More …[y|n] ?**.

If you enter 0 for the lines argument, the command line interface displays information as an uninterrupted stream (which is useful for capturing information to a text file).

Port Renumbering Settings

If you use NAT pinholes to forward HTTP or telnet traffic through your Cayman Gateway to an internal host, you must change the port numbers the Cayman Gateway uses for its own configuration traffic. For example, if you set up a NAT pinhole to forward network traffic on Port 80 (HTTP) to another host, you would have to tell the Cayman Gateway to listen for configuration connection requests on a port number other than 80, such as 6080.

After you have changed the port numbers the Cayman Gateway uses for its configuration traffic, you must use those port numbers instead of the standard numbers when configuring the Cayman Gateway. For example, if you move the router's Web service to port "6080" on a box with a DNS name of "superbox", you would enter the URL ***http://superbox:6080*** in a Web browser to open the Cayman Gateway graphical user interface. Similarly, you would have to configure your telnet application to use the appropriate port when opening a configuration connection to your Cayman Gateway.

set servers web-http [0 - 32767]

Specifies the port number for HTTP (web) communication with the Cayman Gateway. Because port numbers in the range 0-1024 are used by other protocols, you should use numbers in the range 2000-32767 when assigning new port numbers to the Cayman Gateway web configuration interface.

set servers telnet-tcp [0 - 32767]

Specifies the port number for telnet (CLI) communication with the Cayman Gateway. Because port numbers in the range 0-1024 are used by other protocols, you should use numbers in the range 2000-32767 when assigning new port numbers to the Cayman Gateway telnet configuration interface.

System Settings

You can configure system settings to assign a name to your Cayman Gateway and to specify what types of messages you want the diagnostic log to record.

set system name *name*

Specifies the name of your Cayman Gateway. Each Cayman Gateway is assigned a name as part of its factory initialization. The default name for a Cayman Gateway consists of the word “Cayman-XX” and the serial number of the device; for example, Cayman-2E810700. A system name can be 1-64 characters long. Once you have assigned a name to your Cayman Gateway, you can enter that name in the ***Address*** text field of your browser to open a connection to your Cayman Gateway.

NOTE:

Some broadband cable-oriented Service Providers use the **System Name** as an important identification and support parameter. If your Gateway is part of this type of network, do **NOT** alter the System Name unless specifically instructed by your Service Provider

set system diagnostic-level *level*

Specifies the types of log messages you want the Cayman Gateway to record. All messages with a level number equal to or greater than the level you specify are recorded. For example, if you specify set system diagnostic-level 3, the diagnostic log will retain high-level informational messages (level 3), warnings (level 4), and failure messages (level 5).

Use the following values for the ***`level`*** argument:

- **`1`** or **`low`** - Low-level informational messages or greater; includes trivial status messages.
- **`2`** or **`medium`** - Medium-level informational messages or greater; includes status messages that can help monitor network traffic.
- **`3`** or **`high`** - High-level informational messages or greater; includes status messages that may be significant but do not constitute errors.
- **`4`** or **`warning`** - Warnings or greater; includes recoverable error conditions and useful operator information.
- **`5`** or **`failure`** - Failures; includes messages describing error conditions that may not be recoverable.

set system password { admin | user }

Specifies the administrator or user password for a Cayman Gateway. When you enter the **`set system password`** command, you are prompted to enter the old password (if any) and new password. You are prompted to repeat the new password to verify that you entered it correctly the first time. To prevent anyone from observing the password you enter, characters in the old and new passwords are not displayed as you type them.

A password can be as many as eight characters. Passwords are case-sensitive.

Passwords go into effect immediately. You do not have to restart the Cayman Gateway for the password to take effect. Assigning an administrator or user password to a Cayman Gateway does not affect communications through the device.

CHAPTER 7 Glossary

10Base2. IEEE 802.3 specification for Ethernet that uses thin coaxial cable to run at 10 Mbps. Limited to 185 meters per segment. 10Base5 IEEE 802.3 baseband physical layer specification for Ethernet that uses thick coaxial cable to run at 10 Mbps. Limited to 500 meters per segment.

10Base-T. IEEE 802.3 specification for Ethernet that uses unshielded twisted pair (UTP) wiring with RJ-45 eight-conductor plugs at each end. Runs at 10 Mbps.

-----A-----

ACK. Acknowledgment. Message sent from one network device to another to indicate that some event has occurred. See NAK.

access rate. Transmission speed, in bits per second, of the circuit between the end user and the network.

adapter. Board installed in a computer system to provide network communication capability to and from that computer system.

address mask. See subnet mask.

ADSL. Asymmetric Digital Subscriber Line. Modems attached to twisted pair copper wiring that transmit 1.5-9 Mbps downstream (to the subscriber) and 16 -640 kbps upstream, depending on line distance.

AH. The **A**uthentication **H**eader provides data origin authentication, connectionless integrity, and anti-replay protection services. It protects all data in a datagram from tampering, including the fields in the header that do not change in transit. Does not provide confidentiality.

ANSI. American National Standards Institute.

ASCII. American Standard Code for Information Interchange (pronounced ASK-ee). Code in which numbers from 0 to 255 represent individual characters, such as letters, numbers, and punctuation marks; used in text representation and communication protocols.

asynchronous communication. Network system that allows data to be sent at irregular intervals by preceding each octet with a start bit and following it with a stop bit. Compare synchronous communication.

AUI. Attachment Unit Interface. Connector by which a thick (802.3) Ethernet transceiver cable is attached to a networked device.

Auth Protocol. Authentication Protocol for IP packet header. The three parameter values are None, Encapsulating Security Payload (ESP) and Authentication Header (AH).

-----B-----

backbone. The segment of the network used as the primary path for transporting traffic between network segments.

baud rate. Unit of signaling speed equal to the number of number of times per second a signal in a communications channel varies between states. Baud is synonymous with bits per second (bps) if each signal represents one bit.

binary. Numbering system that uses only zeros and ones.

Blowfish. A 64-bit block cipher, contains a variable length key of maximum 448 bits.

bps. Bits per second. A measure of data transmission speed.

BRI. Basic Rate Interface. ISDN standard for provision of low-speed ISDN services (two B channels (64 kbps each) and one D channel (16 kbps)) over a single wire pair.

bridge. Device that passes packets between two network segments according to the packets' destination address.

broadcast. Message sent to all nodes on a network.

broadcast address. Special IP address reserved for simultaneous broadcast to all network nodes.

buffer. Storage area used to hold data until it can be forwarded.

-----C-----

carrier. Signal suitable for transmission of information.

CAST. Encryption algorithm using variable key length of maximum 128 bits.

CCITT. Comité Consultatif International Télégraphique et Téléphonique or Consultative Committee for International Telegraph and Telephone. An international organization responsible for developing telecommunication standards.

CD. Carrier Detect.

CHAP. Challenge-Handshake Authentication Protocol. Security protocol in PPP that prevents unauthorized access to network services. See RFC 1334 for PAP specifications Compare PAP.

client. Network node that requests services from a server.

CPE. Customer Premises Equipment. Terminating equipment such as terminals, telephones and modems that connects a customer site to the telephone company network.

CO. Central Office. Typically a local telephone company facility responsible for connecting all lines in an area.

compression. Operation performed on a data set that reduces its size to improve storage or transmission rate.

crossover cable. Cable that lets you connect a port on one Ethernet hub to a port on another Ethernet hub. You can order an Ethernet crossover cable from Netopia, if needed.

CSU/DSU. Channel Service Unit/Data Service Unit. Device responsible for connecting a digital circuit, such as a T1 link, with a terminal or data communications device.

CTS. Clear to Send. Circuit activated in hardware flow control when a modem (or other DCE) is ready to accept data from the computer (or other DTE). Compare RTS, xon/xoff.

-----D-----

data bits. Number of bits used to make up a character.

datagram. Logical grouping of information sent as a network-layer unit. Compare frame, packet.

DCE. Digital Communication Equipment. Device that connects the communication circuit to the network end node (DTE). A modem and a CSU/DSU are examples of a DCE.

dedicated line. Communication circuit that is used exclusively to connect two network devices. Compare dial on demand.

DES. **D**ata **E**ncryption **S**tandard is a 56-bit encryption algorithm developed by the U.S. National Bureau of Standards (now the National Institute of Standards and Technology).

3DES. Triple DES, with a 168 bit encryption key, is the most accepted variant of DES.

DH Group. Diffie-Hellman is a public key algorithm used between two systems to determine and deliver secret keys used for encryption. Groups 1, 2 and 5 are supported. Also, see Diffie-Hellman listing.

DHCP. Dynamic Host Configuration Protocol. A network configuration protocol that lets a router or other device assign IP addresses and supply other network configuration information to computers on your network.

dial in . Port setting that specifies that other routers can initiate a connection to the local router but that the local router cannot initiate a connection to other routers. A port can be set as both dial in and dial out. Compare dial out.

dial on demand. Communication circuit opened over standard telephone lines when a network connection is needed.

dial out. Port setting that specifies that it can initiate a connection to other routers but that other routers cannot initiate a connection to it. A port can be set as both dial in and dial out. Compare dial in.

Diffie-Hellman. A group of key-agreement algorithms that let two computers compute a key independently without exchanging the actual key. It can generate an unbiased secret key over an insecure medium.

domain name. Name identifying an organization on the Internet. Domain names consists of sets of characters separated by periods (dots). The last set of characters identifies the type of organization (.GOV, .COM, .EDU) or geographical location (.US, .SE).

domain name server. Network computer that matches host names to IP addresses in response to Domain Name System (DNS) requests.

Domain Name System (DNS). Standard method of identifying computers by name rather than by numeric IP address.

DSL. Digital Subscriber Line. Modems on either end of a single twisted pair wire that delivers ISDN Basic Rate Access.

DTE. Data Terminal Equipment. Network node that passes information to a DCE (modem) for transmission. A computer or router communicating through a modem is an example of a DTE device.

DTR. Data Terminal Ready. Circuit activated to indicate to a modem (or other DCE) that the computer (or other DTE) is ready to send and receive data.

-----E-----

echo interval. Frequency with which the router sends out echo requests.

Enable. This toggle button is used to enable/disable the configured tunnel.

encapsulation. Technique used to enclose information formatted for one protocol, such as AppleTalk, within a packet formatted for a different protocol, such as TCP/IP.

Encrypt Protocol. Encryption protocol for the tunnel session.

Parameter values supported include NONE or ESP.

encryption. The application of a specific algorithm to a data set so that anyone without the encryption key cannot understand the information.

ESP. Encapsulation Security Payload (ESP) header provides confidentiality, data origin authentication, connectionless integrity, anti-replay protection, and limited traffic flow confidentiality. It encrypts the contents of the datagram as specified by the Security Association. The ESP transformations encrypt and decrypt portions of datagrams, wrapping or unwrapping the datagram within another IP datagram. Optionally, ESP transformations may perform data integrity validation and compute an Integrity Check Value for the datagram being sent. The complete IP datagram is enclosed within the ESP payload.

Ethernet crossover cable. See crossover cable.

-----F-----

FCS. Frame Check Sequence. Data included in frames for error control.

flow control. Technique using hardware circuits or control characters to regulate the transmission of data between a computer (or other DTE) and a modem (or other DCE). Typically, the modem has buffers to hold data; if the buffers approach capacity, the modem signals the computer to stop while it catches up on processing the data in the buffer. See CTS, RTS, xon/xoff.

fragmentation. Process of breaking a packet into smaller units so that they can be sent over a network medium that cannot transmit the complete packet as a unit.

frame. Logical grouping of information sent as a link-layer unit. Compare datagram, packet.

FTP. File Transfer Protocol. Application protocol that lets one IP node transfer files to and from another node.

FTP server. Host on network from which clients can transfer files.

-----H-----

Hard MBytes. Setting the Hard MBytes parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard MByte value.

The value can be configured between 1 and 1,000,000 MB and refers to data traffic passed.

Hard Seconds. Setting the Hard Seconds parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard Seconds value. The value can be configured between 60 and 1,000,000 seconds

hardware handshake. Method of flow control using two control lines, usually Request to Send (RTS) and Clear to Send (CTS).

HDLC. High-level Data Link Control.

HDSL. High-data-rate Digital Subscribe Line. Modems on either end of one or more twisted pair wires that deliver T1 or E1 speeds. T1 requires two lines and E1 requires three. Compare ADSL, SDSL.

header. The portion of a packet, preceding the actual data, containing source and destination addresses and error-checking fields.

HMAC. Hash-based **M**essage **A**uthentication **C**ode

hop. A unit for measuring the number of routers a packet has passed through when traveling from one network to another.

hop count. Distance, measured in the number of routers to be traversed, from a local router to a remote network. See metric.

hub. Another name for a repeater. The hub is a critical network element that connects everything to one centralized point. A hub is simply a box with multiple ports for network connections. Each device on the network is attached to the hub via an Ethernet cable.

-----I-----

IKE. **I**nternet **K**ey **E**xchange protocol provides automated key management and is a preferred alternative to manual key management as it provides better security. Manual key management is practical in a small, static environment of two or three sites. Exchanging the key is done through manual means. Because IKE provides automated key exchange, it is good for larger, more dynamic environments.

INSPECTION. The best option for Internet communications security is to have an SMLI firewall constantly inspecting the flow of traffic: determining direction, limiting or eliminating inbound access, and verifying down to the packet level that the network traffic is only what the customer chooses. The Cayman Gateway works like a network super traffic cop, inspecting and filtering out undesired traffic based on your security policy and resulting configuration.

interface. A connection between two devices or networks.

internet address. IP address. A 32-bit address used to route packets on a TCP/IP network. In dotted decimal notation, each eight bits of the 32-bit number are presented as a decimal number, with the four octets separated by periods.

IPCP. Internet Protocol Control Protocol. A network control protocol in PPP specifying how IP communications will be configured and operated over a PPP link.

IPSEC. A protocol suite defined by the Internet Engineering Task Force to protect IP traffic at packet level. It can be used for protecting the data transmitted by any service or application that is based on IP, but is commonly used for VPNs.

ISAKMP. **I**nternet **S**ecurity **A**ssociation and **K**ey **M**anagement **P**rotocol is a framework for creating connection specific parameters. It is a protocol for establishing, negotiating, modifying, and deleting SAs and provides a framework for authentication and key exchange. ISAKMP is a part of the IKE protocol.

ISDN. Integrated Services Digital Network. A digital network with circuit and packet switching for voice and data communications at data rates up to 1.544 or 2.048 Mbps over telephone networks.

-----K-----

Key Management . The Key Management algorithm manages the exchange of security keys in the IPSec protocol architecture. SafeHarbour supports the standard *Internet Key Exchange (IKE)*

-----L-----

LCP. Link Control Protocol. Protocol responsible for negotiating connection configuration parameters, authenticating peers on the link, determining whether a link is functioning properly, and terminating the link. Documented in RFC 1331.

LQM Link Quality Monitoring. Optional facility that lets PPP make policy decisions based on the observed quality of the link between peers. Documented in RFC 1333.

loopback test. Diagnostic procedure in which data is sent from a devices's output channel and directed back to its input channel so that what was sent can be compared to what was received.

-----M-----

magic number. Random number generated by a router and included in packets it sends to other routers. If the router receives a packet with the same magic number it is using, the router sends and receives packets with new random numbers to determine if it is talking to itself.

MD5. A 128-bit, **m**essage-**d**igest, authentication algorithm used to create digital signatures. It computes a secure, irreversible, cryptographically strong hash value for a document. Less secure than variant SHA-1.

metric. Distance, measured in the number of routers a packet must traverse, that a packet must travel to go from a router to a remote network. A route with a low metric is considered more efficient, and therefore preferable, to a route with a high metric. See hop count.

modem. Modulator/demodulator. Device used to convert a digital signal to an analog signal for transmission over standard telephone lines. A modem at the other end of the connection converts the analog signal back to a digital signal.

MRU. Maximum Receive Unit. The maximum packet size, in bytes, that a network interface will accept.

MTU. Maximum Transmission Unit. The maximum packet size, in bytes, that can be sent over a network interface.

MULTI-LAYER. The Open System Interconnection (OSI) model divides network traffic into seven distinct levels, from the Physical (hardware) layer to the Application (software) layer. Those in between are the Presentation, Session, Transport, Network, and Data Link layers. Simple first and second generation firewall technologies inspect between 1 and 3 layers of the 7 layer model, while our SMLI engine inspects layers 2 through 7.

-----N-----

NAK. Negative acknowledgment. See ACK.

Name. The Name parameter refers to the name of the configured tunnel. This is mainly used as an identifier for the administrator. The Name parameter is an ASCII and is limited to 31characters. The tunnel name is the only IPSec parameter that does not need to match the peer gateway.

NCP. Network Control Protocol.

Negotiation Method. This parameter refers to the method used during the Phase I key exchange, or IKE process. SafeHarbour supports Main or Aggressive Mode. Main mode requires 3 two-way message exchanges while Aggressive mode only requires 3 total message exchanges.

null modem. Cable or connection device used to connect two computing devices directly rather than over a network.

-----P-----

packet. Logical grouping of information that includes a header and data. Compare frame, datagram.

PAP. Password Authentication Protocol. Security protocol within the PPP protocol suite that prevents unauthorized access to network services. See RFC 1334 for PAP specifications. Compare CHAP.

parity. Method of checking the integrity of each character received over a communication channel.

Peer External IP Address. The Peer External IP Address is the public, or routable IP address of the remote gateway or VPN server you are establishing the tunnel with.

Peer Internal IP Network. The Peer Internal IP Network is the private, or Local Area Network (LAN) address of the remote gateway or VPN Server you are communicating with.

Peer Internal IP Netmask. The Peer Internal IP Netmask is the subnet mask of the Peer Internal IP Network.

PFS-DH. **P**erfect **F**orward **S**ecrecy **D**iffie **H**ellman Group. PFS forces a DH negotiation during Phase II of IKE-IPSec SA exchange. You can disable this or select a DH group 1, 2, or 5. PFS is a security principle that ensures that any single key being compromised will permit access to only data protected by that single key. In PFS, the key used to protect transmission of data must not be used to derive any additional keys. If the key was derived from some other keying material, that material must not be used to derive any more keys.

PING. Packet INternet Groper. Utility program that uses an ICMP echo message and its reply to verify that one network node can reach another. Often used to verify that two hosts can communicate over a network.

PPP. Point-to-Point Protocol. Provides a method for transmitting datagrams over serial router-to-router or host-to-network connections using synchronous or asynchronous circuits.

Pre-Shared Key. The Pre-Shared Key is a parameter used for authenticating each side. The value can be an ASCII or Hex and a maximum of 64 characters.

Pre-Shared Key Type. The Pre-Shared Key Type classifies the Pre-Shared Key. SafeHarbour supports *ASCII* or *HEX* types

protocol. Formal set of rules and conventions that specify how information can be exchanged over a network.

PSTN. Public Switched Telephone Network.

-----R-----

repeater. Device that regenerates and propagates electrical signals between two network segments. Also known as a hub.

RFC. Request for Comment. Set of documents that specify the conventions and standards for TCP/IP networking.

RIP. Routing Information Protocol. Protocol responsible for distributing information about available routes and networks from one router to another.

RJ-45. Eight-pin connector used for 10BaseT (twisted pair Ethernet) networks.

route. Path through a network from one node to another. A large internetwork can have several alternate routes from a source to a destination.

routing table. Table stored in a router or other networking device that records available routes and distances for remote network destinations.

RTS. Request to Send. Circuit activated in hardware flow control when a computer (or other DTE) is ready to transmit data to a modem (or other DCE). See CTS, xon/xoff.

-----S-----

SA Encrypt Type. SA Encryption Type refers to the symmetric encryption type. This encryption algorithm will be used to encrypt each data packet. SA Encryption Type values supported include *DES*, *3DES*, *CAST* and *Blowfish*.

SA Hash Type. SA Hash Type refers to the Authentication Hash algorithm used during SA negotiation. Values supported include *MD5 SHA1*. N/A will display if NONE is chose for Auth Protocol.

Security Association. From the IPSEC point of view, an SA is a data structure that describes which transformation is to be applied to a datagram and how. The SA specifies:

- The authentication algorithm for AH and ESP
- The encryption algorithm for ESP
- The encryption and authentication keys
- Lifetime of encryption keys
- The lifetime of the SA
- Replay prevention sequence number and the replay bit table

An arbitrary 32-bit number called a Security Parameters Index (SPI), as well as the destination host's address and the IPSEC protocol identifier, identify each SA. An SPI is assigned to an SA when the SA is negotiated. The SA can be referred to by using an SPI in AH and ESP transformations. SA is unidirectional. SAs are commonly setup as bundles, because typically two SAs are required for communications. SA management is always done on bundles (setup, delete, relay).

serial communication. Method of data transmission in which data bits are transmitted sequentially over a communication channel

SHA-1. An implementation of the U.S. Government **S**ecure **H**ash **A**lgorithm; a 160-bit authentication algorithm.

SLIP. Serial Line Internet Protocol. Predecessor to PPP that allows communication over serial point-to-point connections running TCP/IP. Defined in RFC 1055.

Soft MBytes. Setting the Soft MBytes parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Soft MByte value. The value can be configured between *1 and 1,000,000 MB* and refers to data traffic passed. If this value is not achieved, the Hard MBytes parameter is enforced.

Soft Seconds. Setting the Soft Seconds parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Soft Seconds value. The value can be configured between 60 and 1,000,000 seconds.

SPI . The **S**ecurity **P**arameter **I**ndex is an identifier for the encryption and authentication algorithm and key. The SPI indicates to the remote firewall the algorithm and key being used to encrypt and authenticate a packet. It should be a unique number greater than 255.

STATEFUL. The Cayman Gateway monitors and maintains the state of any network transaction. In terms of network request-and-reply, state consists of the source IP address, destination IP address, communication ports, and data sequence. The Cayman Gateway processes the stream of a network conversation, rather than just individual packets. It verifies that packets are sent from and received by the proper IP addresses along the proper communication ports in the correct order and that no imposter packets interrupt the packet flow. Packet filtering monitors only the ports involved, while the Cayman Gateway analyzes the continuous conversation stream, preventing session hijacking and denial of service attacks.

static route. Route entered manually in a routing table.

subnet mask. A 32-bit address mask that identifies which bits of an IP address represent network address information and which bits represent node identifier information.

synchronous communication. Method of data communication requiring the transmission of timing signals to keep PPP peers synchronized in sending and receiving blocks of data.

-----T-----

T1 link. Digital transmission link capable of speeds up to 1544 kilobits per second.

TA. Terminal adaptor. Device that connects a network or terminal to an ISDN network.

telnet. IP protocol that lets a user on one host establish and use a virtual terminal connection to a remote host.

twisted pair. Cable consisting of two copper strands twisted around each other. The twisting provides protection against electromagnetic interference.

-----U-----

UTP. Unshielded twisted pair cable.

-----V-----

VJ. Van Jacobson. Abbreviation for a compression standard documented in RFC 1144.

-----W-----

WAN. Wide Area Network. Private network facilities, usually offered by public telephone companies but increasingly available from alternative access providers (sometimes called Competitive Access Providers, or CAPs), that link business network nodes.

WWW. World Wide Web.

-----X-----

xon/xoff. Special characters used for software flow control to regulate communication between a device and a modem.

CHAPTER 8 Technical Specifications and Safety Information

Description

Dimensions: 13.5 cm (w) x 13.5 cm (d) x 3.5 cm (h)
5.25” (w) x 5.25” (d) x 1.5” (h)

Communications interfaces: The Netopia 3300 Series Gateways have an RJ-11 jack for WAN line connections and 1 or 4–port 10/100Base-T Ethernet switch for your LAN connections. Some models have a USB port that can be used to connect to your PC.

Power requirements

- 12 VDC input
- 1.0 amps

Environment

Operating temperature: 0° to +40° C

Storage temperature: 0° to +70° C

Relative storage humidity: 20 to 80% noncondensing

Software and protocols

Software media: Software preloaded on internal flash memory; field upgrades done via download to internal flash memory via TFTP or web upload.

Routing: TCP/IP Internet Protocol Suite, RIP

WAN support: PPPoE, DHCP, static IP address

Security: PAP, UI password security

Management/configuration methods: HTTP (Web server),Telnet

Diagnostics: Ping, event logging, routing table displays, traceroute, statistics counters, web-based management

Agency approvals

North America

Safety Approvals:

- United States – UL: 1950 Third Edition
- Canada – CSA: CAN/CSA-C22.2 No. 950-95

EMC:

- United States – FCC Part 15 Class B
- Canada – ICES-003

Telecom:

- United States – FCC Part 68
- Canada – CS-03

International

Safety Approvals:

- Low Voltage (European directive) 73/23
- EN60950 (Europe)

EMI Compatibility:

- 89/336/EEC (European directive)
- EN55022:1994 CISPR22 Class B
- EN300 386 V1.2.1

Regulatory notices

European Community. This Netopia product conforms to the European Community CE Mark standard for the design and manufacturing of information technology equipment. This standard covers a broad area of product design, including RF emissions and immunity from electrical disturbances.

The Netopia 3300 Series complies with the following EU directives:

- Low Voltage, 73/23/EEC
- EMC Compatibility, 89/336/EEC, conforming to EN 55 022

Manufacturer’s Declaration of Conformance

Warnings:

This is a Class B product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures. Adequate measures include increasing the physical distance between this product and other electrical devices.
Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

United States. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to

which the receiver is connected.

- Consult the dealer or an experienced radio TV technician for help.

Service requirements. In the event of equipment malfunction, all repairs should be performed by our Company or an authorized agent. Under FCC rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or our of warranty. It is the responsibility of users requiring service to report the need for service to our Company or to one of our authorized agents. Service can be obtained at Netopia, Inc., 6001 Shellmound Street, Emeryville, California, 94608.

Important

This product was tested for FCC compliance under conditions that included the use of shielded cables and connectors between system components. Changes or modifications to this product not authorized by the manufacturer could void your authority to operate the equipment.

Canada. This Class B digital apparatus meets all requirements of the Canadian Interference -Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Declaration for Canadian users

The Canadian Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operation, and safety requirements. The Department does not guarantee the equipment will operate to the user’s satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to the certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

Important Safety Instructions

Australian Safety Information

The following safety information is provided in conformance with Australian safety requirements:

Caution

DO NOT USE BEFORE READING THE INSTRUCTIONS: Do not connect the Ethernet ports to a carrier or carriage service provider’s telecommunications network or facility unless: a) you have the written consent of the network or facility manager, or b) the connection is in accordance with a connection permit or connection rules.

Connection of the Ethernet ports may cause a hazard or damage to the telecommunication network or facility, or persons, with consequential liability for substantial compensation.

Caution

- The direct plug-in power supply serves as the main power disconnect; locate the direct plug-in power supply near the product for easy access.
- For use only with CSA Certified Class 2 power supply, rated 12VDC, 1.0A.

Telecommunication installation cautions

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

FCC Part 68 Information

a) This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the bottom of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

b) List all applicable certification jack Universal Service Order Codes (“USOC”) for the equipment: RJ11.

c) A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

d) The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2002, the REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

e) If this equipment, the Netopia 3300 Series router, causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn’t practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

f) The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

g) If trouble is experienced with this equipment, the Netopia 3300 Series router, for repair or warranty information, please contact:

Netopia Technical Support
510-597-5400
www.netopia.com.

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

h) This equipment not intended to be repaired by the end user. In case of any problems, please refer to the troubleshooting section of the Product User Manual before calling Netopia Technical Support.

i) Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

j) If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this Netopia 3300 Series router does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or qualified installer.

Electrical Safety Advisory

Telephone companies report that electrical surges, typically lightning transients, are very destructive to customer terminal equipment connected to AC power sources. This has been identified as a major nationwide problem. Therefore it is advised that this equipment be connected to AC power through the use of a surge arrestor or similar protection device.

Index

Cayman 3000 series by Netopia

Netopia, Inc.
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